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NOTICE TO READERS.

This Journal is devoted to the advancement of PHARMACEUTICAL KNOWLEDGE and to the promotion of a MORE THOROUGH EDUCATION and PRACTICAL TRAINING for all persons engaged in PREPARING and DISPENSING medicines, drugs and chemicals.

It embodies a large amount of information EXTREMELY VALUABLE TO APOTHECARIES, DRUGGISTS and PHYSICIANS—comprehending, in fact, a faithful record of the development of PHARMACEUTICAL SCIENCE AND INVENTION both in Europe and America, during the period of its issue, commencing with 1839.

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An ADVERTISING SHEET is appended to each number, in which suitable advertisements will be inserted, a proper discrimination being observed in relation to their character.

Address all papers for publication, etc., to the Editor JOHN M. MAISCH.

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COMMENCEMENT NOTICE.

The Sixty-fifth Annual Commencement will take place at the American Academy of Music on Thursday noon, March 18th. The Valedictory Address will be delivered by Prof. J. M. Maisch, Phar.D. Tickets will be mailed to the members. The Alumni are invited to occupy seats on the stage with the faculty, officers and members of the College. The music will be furnished by Easterns Orchestra. Doors will be open at 11 o'clock, music commences at 11 30. Tickets for the Alumni can be had of the actuary at the College, after March 10th, between 2 and 6 P. M.

ALUMNI ASSOCIATION

Philadelphia College of Pharmacy.

The 22d Annual Meeting of the Association will be held in the Alumni room at the College, No. 145 N 10th St., on Tuesday, March 16th, 1886, at 2 o'clock P. M. Election of officers for the ensuing year and other business will be transacted.

The 22d Annual Reception to the 65th Graduating Class, will be held at *Natatorium* Hall, Broad St. below Walnut, on Tuesday evening, March 16th, at 7.30 o'clock P. M. Annual Oration by Clement B. Low, Ph.G. Class 1884. Distribution of the usual Prizes. Class oration by James E. Buckley, of New Tacoma, W. T. History of Class 1884-5 and 6, by Jos. P. Williams, of Wilmington, Del. Address by Class prophet, C. H. McCoy, of Lebanon, Ill. All graduates, students and others invited to attend.

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STATE.	TIME.	PLACE.	LOCAL SECRETARY.
Alabama,	May 11,	Birmingham,	G. M. Bains.
Arkansas,	April,	Little Rock,	
Georgia,	April 13,	Savannah,	W. S. Parks, Atlanta.
Kentucky,	May 5,	Bowling Green,	Wm. Turner
Louisiana,	April 21,	New Orleans,	Mrs. E. Rudolph.
Mississippi,	May 18,	Jackson,	H. F. West, Fayette.
Nebraska,	May 11,	Omaha,	C. J. Danbach.
New Jersey,	May 19,	Newark,	R. H. Vansant, Trenton.
Virginia,	May 11,	Alexandria,	E. Warfield.

GENERAL INDEX.

In order to make a complete set of the American Journal of Pharmacy more valuable to those possessing or consulting it, the Committee on Publication have decided to offer the remaining copies of the General Index to the first 42 Vols., from its commencement, Dec., 1825, to Nov., 1870, inclusive, at the REDUCED PRICE of

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THE AMERICAN
JOURNAL OF PHARMACY.

MARCH, 1886.

ANALYSIS OF ARISTOLOCHIA FŒTIDA.

(*Yerba del Indio.*)

By Henry Trimble and Samuel S. Jones.

(Read at the Pharmaceutical Meeting, February 16th.)

The root of the above plant, from H. J. Schuchard, Ph. G., of San Antonia, Texas, consists of globular pieces much resembling jalap in size and appearance; externally almost black, and internally, when dry, reddish brown. It possesses a slightly astringent taste and a strong narcotic odor. The loss on drying amounted to 14·10 per cent., and the ash 4·88 per cent.; the latter was found to be composed of the usual constituents.

I. Twenty grams in fine powder yielded to petroleum spirit 1·95 per cent. of a fixed oil, soluble in absolute alcohol and stronger ether, less so in ordinary alcohol. It saponified with aqueous solution of potassium hydrate, yielding a soap on the addition of sodium chloride, which possessed a purplish-red color, due to the presence of a small quantity of the coloring matter.

II. The stronger ether extraction gave but ·5 per cent. of residue, consisting of a resin, soluble in absolute alcohol, chloroform and benzol, and traces of tannin.

III. Absolute alcohol extracted 7·64 per cent. of organic matter, which was partly soluble in water, composed of tannin and its decomposition products 5·3 per cent., and coloring matter 1·3 per cent. There was an absence of reactions indicating glucosides or alkaloids.

IV. Water extracted from the remainder, after subtracting the inorganic portion, 10·24 per cent., made up of mucilage, 2·5 per cent., tannin, 2·6 per cent., coloring matter, 5·14 per cent. A separate determination of the tannin with 10 grams of the original drug, showed the presence of about 11·66 per cent.

V. A 0·2 per cent. solution of sodium hydrate extracted 1·9 per cent. of albuminoids and coloring matter.

VI. Hydrochloric acid (1 per cent.) dissolved 4·11 per cent. of organic matter, which was not further examined.

The residue, after drying, amounted to 52·68 per cent., which yielded 3·75 per cent. to chlorine water, thus representing 48.93 per cent. of cellulose.

75 grams of the original drug were distilled with milk of lime. The first portions of the distillate possessed the narcotic odor of the drug to a marked degree. On shaking this with chloroform the latter took the odor and the alkaline reaction of the distillate. The chloroform was allowed to evaporate spontaneously and the residue dissolved in alcohol gave ammonia on heating with potassium hydrate, and precipitated with a number of the alkaloidal reagents.

While we are not prepared to say there is a volatile alkaloid present, we consider the evidence in favor of such a belief. An insufficient amount of material and the approach of the College examinations prevented further work on this interesting material, which is recommended in the Mexican Pharmacopœia as a good remedy for colic. From other sources we learn it has been used for tanning purposes, but judge the large amount of coloring matter present would be a serious drawback.

The following is a summary of the constituents found:—

Moisture	14·10 per cent.
Ash	4·88 "
Fixed oil	1·95 "
Resin	·50 "
Soluble in absolute alcohol: tannin, coloring matter	7.64 "
Soluble in water: mucilage, tannin and coloring matter	10·24 "
Alluminoids	1·90 "
Soluble in dilute hydrochloric acid	4·11 "
Lignin	52·68 "
	98·00

Antipyrin resembles sodium salicylate in its action, and is recommended by Dr. Neumann (*Berl. Klin. Woch.*), for further trial in chronic rheumatism of the joints and in rheumatic neuralgia. Dr. A Walker (*Brit. Med. Jour.*, Nov. 7, 1885) has observed it, in two cases of typhoid fever, to produce reduction of temperature to about normal, and good refreshing sleep for 5 or 6 hours; 15 grains of the remedy were given at 9 P. M., and 7½ grains each at 10 and at 11 P. M. Antipyrin was also found useful to produce sleep in several cases of pyrexia in young children. Teaspoonful doses three times a day of the following mixture have been used by Dr. Dumolard in typhoid fever: Antipyrin 20, Jamaica rum 30, water 150, and syrup 150 grams.

NOTE ON YERBA AND RAIZ DEL INDIO.

By John M. Maisch.

In the preceding paper, by Messrs. Trimble and Jones, reference is made to the "yerba del indio" admitted into the Mexican Pharmacopœia. The second edition of this work refers the drug in question to Aristolochia fœtida, *Kunth*, and further states, that the plant grows in Ario and other hot districts of the Republic; that the decoction of the leaves and stems enjoys a great reputation as a vulnerary, and that the root is a detersive stimulant.

During the winter of 1874–1875, Rudolph F. G. Voelcker, Ph. G., made a chemical examination of "raiz del indico," the results of which were published in Amer. Jour. Pharm., 1876, p. 49. Specimens of Mr. Voelcker's root, which were then shown to me, though somewhat smaller than the roots examined by Messrs. Trimble and Jones, so strongly resembled the latter, that I am inclined to regard the two drugs as identical. But Mr. Voelcker's root was obviously not obtained from an aristolochia; for the fresh roots, on being planted produced leaves which were *stipulate*, 12 to 13 inches long, 2½ to 3 inches broad, *oblanceolate*, acute, *smooth*, shining, juicy and light-green. Unfortunately the plants had not produced flowers, and I have no information whether they have bloomed in subsequent years. The character of the leaves and the chemical behavior of some of the constituents of the root led Mr. Voelcker to infer that the plant belongs to the natural order of Polygonaceæ. It is certain that it cannot be an aristolochia in which genus the leaves are *exstipulate* and at the base usually heart-shaped.

Aristolochia fœtida, *Kunth*, is a shrubby, twining plant with a somewhat angular and hairy stem; its leaves are reniform-cordate with a short acumination; the basal lobes are rounded and form a narrow sinus, and the base proper is wedge-shaped and decurreat into the petiole; both sides, but more particularly the upper one, are beset with appressed hairs. The leaves are 12 Cm. (4½ inches) long and broad; the petioles are somewhat shorter, grooved above and somewhat hairy. The plant was found by Humboldt and Bonpland in shady places at an altitude of 1,950 meters (about 6,000 feet), and at that time was known as "yerba del indio" and enjoyed considerable celebrity in the treatment of ulcers, the decoction being used as a wash.

It is evident from this description that the "yerba del indio" of

the Mexican Pharmacopœia cannot be the parent plant of the root examined by Mr. Voelcker. It seems likely, however, that the latter is identical with a root, also known by the name *cañaigre*. At least in the "Report of the Commissioner of Agriculture for the year 1879," a plant is figured, the leaves of which agree in the main with Mr. Voelcker's description, as well as the characteristics of the root given in the report by Mr. Wm. Saunders, superintendent of gardens and grounds in Washington, D. C., who speaks in the Report (page 364) as follows:

"In the report of the department for 1878, at page 119, will be found an analysis of the above-named root (cañaigre)[1]. The main object of the examination was to determine the amount of tannic acid contained in this root which was received from Texas, where it has long been used by the Indians and others for tanning purposes, and is said to be used at present by several tanneries in and about San Antonio. From the analysis it appears that the root contains about 23 per cent. of tannic acid[2], and the fact that the article is employed in tanneries would seem to indorse its practical adaptability as a tanning material. Cañaigre is the bulbous root of a kind of dock specifically called *Rumex hymenosepalum* (Torrey). It grows plentifully in sandy soils over a large territory on both sides of the Rio Grande, and from there northward over a large portion of Western Texas. The bulbs are produced in clusters like some kinds of sweet potatoes, some clusters weighing several pounds, and can be procured, it is stated, at a cost not exceeding $1 per 100 pounds. The leaves of the plant are somewhat fleshy when in the young state, when they are greedily eaten by cattle, and occasionally used as a pot-herb by travelers and others."

The facts as far as they are accessible to me at the present time, point to the identity of the three samples of roots mentioned above, and that they have been derived from the neighborhood of the Rio Grande. From the brief history given it is not in the least surprising that in some localities of Texas this root should have become popularly known as "raiz del indio," and the herbaceous plant yielding it as "yerba del indio," which latter name has long been applied in the interior of Mexico to a woody climber, the root of which, doubtless, differs from the former considerably in its morphological characters,

[1] I have not been able to consult the report containing this analysis.—J.M.M.

[2] Mr. Voelcker found 23·13 per cent. of tannin.—J. M. M.

as it seems to differ in medical properties. I hope to procure reliable specimens with the view of removing any doubt or uncertainty that may still exist.

LABORATORY NOTES.

Abstracts from Theses.

Nabalus albus, Hooker, is known as white lettuce, lion's foot and rattlesnake root. The milky juice used internally and the leaves applied topically were formerly employed in bites of the rattlesnake, and a decoction of the root is used in domestic practice in dysentery and as a tonic. Neri B. Williams, Ph.G., described the root as being tuberous, from 1 to 6 inches long, ½ to 1 inch thick, furnished with several rootlets, yellowish, internally white and emitting a milk-juice; after drying it breaks with a short fracture and is readily powdered; the odor is slight and peculiar, and the taste bitter.

A *tincture*, made with diluted alcohol, 4 oz. of the powdered root to the pint, was of a deep amber color, and was advantageously used by a physician in anemic diarrhœa, chronic dysentery, and in typhoid fever for its tonic and astringent properties; also topically in a case of pruritus ani.

A proximate analysis of the root showed the presence of tannin, gum, extractive, coloring matter, waxy matter and resins, partly soluble in ether. The ash amounted to about 12 per cent.

Fraxinus americana.—Jos. C. Roberts, Ph.G., obtained the following results with the root bark:

1. Moisture, loss by drying at 105° C., 9·63 per cent.

2. Ash, 5·33 per cent. Of this amount 6·25 per cent. were soluble in water, 86.67 per cent. soluble in dilute hydrochloric acid, and the remainder soluble in caustic soda.

3. Benzol extracted 0·67 per cent., containing a little volatile oil. The filtered aqueous solution of the extract gave a precipitate with phosphomolybdic acid, the portion insoluble in water was resin and dissolved in 80 per cent. alcohol.

4. Alcohol (80 per cent.), yielded a brown, somewhat bitter and acrid extract, which on being treated with various solvents and chemicals showed the presence of tannin, alkaloid, resin and sugar.

5. The remaining constituents found were gummy matter, starch, and coloring matter.

Glucosides could not be detected. The volatile oil was of a yellow color, somewhat aromatic and had a rather bland taste. The amount of alkaloid obtained was very small; it refused to crystallize and was contaminated with coloring matter.

Blackberry bark.—Andrew C. Santee, Ph.G., determined in the root bark by qualitative tests the presence of tannin, gummy matter, sugar, little resin, and a saponin-like body, which was not isolated.

Amomum Melegueta, Roscoe.—The seeds, known as melegueta pepper, or grains of Paradise, were examined by Fred. Schwartz, Ph.G., with the following results:

The powder thoroughly dried by heat lost 18 per cent. of moisture and volatile oil, and on incineration gave 9 per cent. of gray ash. Treatment with cold water furnished a light brown infusion, containing albumen, gummy matter and a little tannin. Benzin now exhausted 5 per cent. of a reddish-brown oily matter, having a slight aromatic odor and a burning taste, and soluble in carbon bisulphide and in ether; on redissolving it in little benzin, the addition of alcohol precipitated a white fat. The powder now yielded to alcohol a reddish-brown acrid resin, which is soluble in ether, but insoluble in carbon bisulphide. Neither bisulphide of carbon nor ether took up any compound from the powder exhausted as above; but treatment with boiling water furnished an amylaceous jelly.

Scammony.—Chas. M. Rebner, Ph.G., examined samples of commercial scammony; the results arranged, according to the amount of resin obtained, were as follows:

1. Starch present; 26 per cent. soluble in ether.
2. " " 40 " " "
3. " " 78·30 " " "
4. " absent; 79·23 " " "
5. Wholly soluble in ether. This specimen was a rather fine, light yellowish powder, and had the odor and taste of scammony; it was resin of scammony.

None of the samples produced any effervescence with hydrochloric acid; and the resin was, in all cases, soluble in hot solution of potassa, and not precipitated on the subsequent addition of an acid.

Elixir of Coca.—Llewellyn H. Lewis, Ph.G., suggests this preparation to be made so that a pint represents the virtues of 4 ozs. of the

leaves. The leaves are powdered and percolated with a mixture of 3 parts of alcohol and 1 part of water, until 11½ fluid ozs. of tincture are obtained, to which is added a solution of oil of orange, 6 drops, and oil of cinnamon, 2 drops, in ½ fluid ounce of alcohol, and afterward 4 fluid ounces of simple syrup.

Fluid Extract of Quebracho.—Henry J. Wegener, Ph.G., has repeatedly been relieved of asthma, caused by handling powdered ipecacuanha, by taking a dose of this fluid extract.

Fluid Extract of Cotton Root-bark.—Chas. C. Ramey, Ph.G, reports several experiments made with this fluid extract, which had been filtered from the precipitate formed therein in about a year, and which in this condition had no effect when used by a physician in cases of menorrhagia. On the other hand, several doses of one grain pills, made from the dried precipitate, produced considerable nausea and effected a diminution of the flow in excessive menstruation. The menstruum used for the fluid extract is not stated.

The coloring matter of Hydrastis is precipitated from the aqueous infusion of the root by basic acetate of lead, according to John W. Newton, Ph.G. After decomposing the precipitate by sulphuretted hydrogen, the coloring matter was again soluble in water, and this solution, which contained 5·90 per cent. of solid matter, did *not* dye cotton cloth, for which acetate of iron, ferric chloride, aluminium acetate, or potassium bichromate had been used as mordants. Subsequently, sodium carbonate and sulphuric acid were added in turn without altering the result.

Hydrargyrum cum Creta.—Robert B. Matter, Ph.G., suggests the following process, which in his hands, has been uniformly successful, and by which 4 or 8 oz. of the preparation can be made within one hour.

Mix 12 parts of finely powdered gum arabic with 12 parts of prepared chalk, triturate it with water sufficient to form a rather thin paste, add 38 parts of mercury and continue the trituration until the globules of mercury have disappeared. Now add 38 parts of finely powdered prepared chalk and sufficient water to form a thin paste, triturate and when all the globules of mercury have disappeared, place the mortar in a hot water-bath. The mixture distributed around the sides of the mortar, will dry rapidly, when it can be easily scraped out, powdered in a clean mortar, passed through bolting cloth, or a fine sieve, and finally rubbed lightly in a clean dry mortar.

ON A NEW PROCESS FOR ESTIMATING TANNIN VOLUMETRICALLY.

By Joseph W. England, Ph. G.

Many processes have been recommended for the volumetric estimation of tannin, but the greater number of them are tedious and difficult to carry out in practice, and even when accomplished yield results far from satisfactory. The process offered by E. Durien (*Annali di Chim. Med. Farm.*, Dec., 1885, p. 350; *Jour. Phar. Chim.*, 1885, xii, p. 374), is very easy of execution and is based upon the following reactions:—

1. That the addition of chloride of iron solution to one of tannin forms a black or green coloration; and—

2. That this coloration is destroyed, little by little, and then completely, on the addition of a solution of chlorinated lime.

The mode of operation, with the results obtained, is as follows:— 1. Prepare a solution of calcium hypochlorite (10· gm.) in distilled water (200· gm.) and filter. 2. Make a second solution of pure tannin by this formula:—

Tannin, pure	0·10 gm.
Officinal solution of ferric chloride [1]	15 drops.
Acid acetic, concentrated (glacial)	20 drops.
Distilled water	20· c c.

This solution is made in a 100 c c. glass flask and serves as a titrate to the first solution. With a Gay-Lussac burette, graduated to the one-tenth of a c c., rapidly add, drop by drop, the hypochlorite, agitating after each addition, when the green or black color of the liquid will gradually grow lighter and pass, suddenly, to a rose-brown, at which point the operation must be arrested. This rose-brown color, by the action of the air, passes to a green, but there is no need of taking into calculation this secondary reaction. Working in this manner it will be found that 14 c c. of solution of hypochlorite will be required to destroy the inky color formed from 0·10 gm. of pure tannin.

To fully establish the accuracy of his method, Mr. Durien made various mixtures of sugar and pure tannin, in order to ascertain what

[1] Chlorure Ferrique dissous, French Codex, sp. gr. 1·26; containing 26 per cent. $Fe_2 Cl_6$.

influence, if any, organic substances might have upon the results. The following table gives the figures obtained:

Substance.	Amount.	Sol. of hypochlorite used	Tannin found.	Tannin calculated.	Difference.
Tannin, pure.....	0·10 Gm.	14 c c.	.....	.....	.....
Mixture A.....	0·15 "	10·5 cc.	0·075 Gm.	0·075 Gm.	0·000 Gm.
" B.....	0·20 "	13·9 cc.	0·099 "	0·100 "	0·001 "
" C.	0·30 "	20·8 cc.	0·148 "	0·150 "	0·002 "

This series of analyses demonstrates that with this test a most excellent approximation may be made to the quantity of tannin present, and that sugar has no influence on the results. With this process, an assay of commercial tannin can be made in less than ten minutes.

In further extension of this subject, it may be said by the translator of the above that some time ago, without any knowledge of the existence of this method, he endeavored to discover a practical method of tannin analysis based, as in this process, on the decomposition of ink, using, however, a neutral solution. For that purpose I employed ammonia water, which, whilst it changed the ink to a reddish color in very dilute solution, with the precipitation of ferric oxide, was inapplicable for general practice, because of a somewhat similar action upon other organic matter. Potassium hydrate had a like influence. The ferric tannate is also decolorized by chlorine water, diluted sulphuric, nitric, hydrochloric, nitrohydrochloric, or phosphoric acids. Strong acetic acid exerts no change upon it. Gallic acid in a dilute inky-rendered solution, is altered in color by AmHO or KHO, with the formation of a deep rosy-colored solution, resuming its original tint on neutralization with acetic acid. Ferric gallate is destroyed in color by chlorine water, diluted sulphuric, nitric, hydrochloric, nitrohydrochloric or phosphoric acids, but not by strong acetic acid. Hypochlorites will also destroy its color, but alkaline chlorides make no change.

It may be suggested that sodium hypochlorite, in the form of "Labarraques' Solution," deprived of free chlorine gas, be employed instead of the calcium compound, as more readily applicable, since the results afforded by each are the same. The contained sodium chloride exerts no action upon the tannin-ink, so the change is

entirely dependent upon the hypochlorite alone, in the absence of free chlorine gas, which also has the same properties of decolorization.

Since gallic acid, as well as tannin, rendered inky by the addition of ferric salts, is changed in color by hypochlorites, the absence of that body in the tannin solutions must be previously determined in the application of Mr. Durien's method.

MATERIA MEDICA OF THE NEW MEXICAN PHARMACOPŒIA.

By the Editor.

(Continued from page 77.)

Sanguinaria, Illecebrum Paronychia, *Lin.*, Caryophyllaceæ; in the valley of Mexico. The flowers are astringent.

Saponaria. Anagallis arvensis, *Lin.*, Primulaceæ, is usually substituted for Sap. officinalis; the former is known as "coralilla" or "saponaria de país."

Saúco, Sambucus mexicana, *Priestley;* Caprifoliaceæ. The flowers, leaves, bark and berries, which have not been analyzed, are used in a similar manner, as the corresponding parts of the European elder.

Semillas de bálsamo, Myrospermum Pereiræ, *Royle;* Leguminosæ; in Cuautla de Morelos, Pánuco and other hot districts. The legumes are indehiscent, one-celled, one-seeded, oval and scimetar-shaped, brownish yellow, rugose on the surface, convex and keeled on the margin, and provided with a wing which is much elongated above; the pericarp contains ducts which are filled with a resinous balsamic matter. Other fruits found in commerce, which have a longer wing and a less delicate odor, are produced by Myrospermum peruiferum. The fruit is antispasmodic and stimulant, and the tincture is employed internally as an antispasmodic, and externally against rheumatism.

Siempreviva de México, Aizoon canariense, *Lin.;* Ficoidaceæ; cultivated. Used as a dentifrice and antiscorbutic, and the juice as an astringent.

The name siempreviva is also applied to other plants of different genera and families, like Bryophyllum calycinum, *Lin.* (also called Bruja or Amor tras de la puerta), several species of Helichrysum, &c.

Simonillo, Calea Zacatechichi, *De Cand.;* Compositæ; in the Mexican valley, Puebla, Orizaba, &c. The plant is used popularly as a tonic and antiperiodic in infusion 8:500. Drs. Soriano, Campuzano and others have used it successfully against hepatic calculi.

Sinfito or Sueldaconsuelda. The roots of Potentilla aurea, *Lin.*, and of the more common P. multifida, *Lin.*, are astringent, and are believed to have the same properties as the European comfrey.

Sinicuiche, Nesæa salicifolia, *Kunth;* Lythraceæ; in Tenancingo. The infusion of the leaves is used in indigestion and it is said to produce a very agreeable intoxication, and that those who have taken it, see all objects of a yellow color.

Socoyol, Oxalis angustifolia, *Kunth*, O. verticillata *Mociño*, O. corniculata, *Lin.*, and O. violacea, *Lin.* The leaves contain potassium oxalate and may be substituted for sorrel.

Tabaco. Besides Nicotiana Tabacum, *Lin.*, the aborigines cultivate also N. rustica, *Lin.*, N. paniculata and other species. As "tabaco cimarron" are used N. pusilla, *Lin.*, in Veracruz, N. pilora, *Dunal*, and N. trigonophylla, *De Cand.*, in Aguascalientes, N. mexicana, *Schlechtendal*, and others. N. glauca, *Graham*, is called, "tabaquillo." All these species possess similar properties.

Tabachin, Poinciana pulcherrima, *Lin.;* Leguminosæ; in the hot and moist districts of the western slope. The leaves are purgative and emmenagogue. The legumes are employed for tanning and for dying wool yellow with alum and black with iron salts. The analysis (of the legumes?) by Ricord Madiana, showed the presence of gallic acid, tannin, red coloring matter, gum, soft resin, benzoic acid and salts.

Tacamaca, Icica heptaphylla, *Aublet;* Terebinthaceæ; in various hot districts of America. Fragments opaque, frequently with pieces of bark adhering, the surface covered with a gray efflorescence, the layers beneath alternately sulphur-yellow and dull white or dingy gray, odor resinous, taste bitter; fusible and on burning giving off smoke having the odor of frankincense. Other varieties of tacamaca are rarely seen in Mexican commerce. Stimulant and antispasmodic in doses of 0·5 to 2·0 gm.; mostly used externally.

Tacopatle, Aristolochia mexicana, *Flor. Mex. ined.;* Aristolochiaceæ; in Guerrero and other hot districts. The root is of the thickness of a goosequill, gray and wrinkled and has a yellowish meditullium and a pungent and bitter taste. Antispasmodic.

Tamarindo, Tapioca, Tapsia (root and resin), Té (tea), Tilia, Toloache (stramonium), Tormentila, Trigo (wheat), Turbit vegetal (turpeth root), Tusílago (coltsfoot leaves and flowers), Uña de gato (rose hips), Vainilla, Verbena (V. officinalis and V. caroliniana), Verdolaga (Portulaca oleracea), Verónica (V. peregrina and V. officinalis), and

Violeta española (sweet violet petals), are mentioned as medicinal articles.

Tanibata, Ipomœa stans, *De Cand.;* Convolvulaceæ; in the mountains of Guadalupe. The root is purgative.

Taray de México, Varennea polystachya, *De Cand.;* Leguminosæ; in the ravines of Mochitiltic, near Puebla, &c. The wood is seen in commerce in pieces of various dimensions; bark fissured, reddish brown; wood yellowish with a brownish tint, some layers reddish, compact; taste sweetish and astringent when fresh, and after drying slightly astringent. The infusion is used in diseases (epizootias) of chickens, and the decoction in inflammations of the kidneys and of the bladder. For this wood that of "palo dulce," Eysenhartia amorphoides, of the same natural order is frequently substituted; it is readily distinguished by its white color. The taray of Europe, Tamarix gallica is not used in Mexico.

The gum, which exudes spontaneously, is in small agglutinated fragments, superficially opaque, the fractures glossy and vitreous, reddish brown, resembling kino; odor faint; taste very astringent and free from bitterness. According to Oliva it consists of tannin with a small quantity of coloring matter and impurities. It has the same medicinal properties as tannin and may advantageously be substituted for kino.

Té limon, a cultivated grass, probably Andropogon citratus, *De Cand.* The infusion of the leaves, 1:250, is used as a digestive stimulant and antispasmodic.

Té de Milpa, Bidens tetragona, *De Cand.;* Compositæ; in the Mexican valley, &c. The leaves after having been transiently subjected to the action of boiling water, then dried and rolled like Chinese tea, are used like the latter. Mendoza found them to contain tannin, fat, concrete volatile oil, protein compound and coloring matters. Bidens leucantha, *De Cand.*, is known by the same name and the leaves are used in a similar manner.

Tecomate, Crescentia Cujete, *Lin.;* Bignoniaceæ; in hot districts. The pulp of the fruit is used in various affections of the liver and for its pectoral properties.

Tejocote, Cratægus mexicana, *Mociño et Sessé;* Rosaceæ; indigenous and cultivated. The decoction of the root has antidysenteric and diuretic properties, and that of the fruit is pectoral; the latter yields an abundance of jelly and is much used as an aliment.

Tepeacuilotl, Cornus alba, *Lin.;* Cornaceæ; Monte de las Cruces. The bark is tonic and astringent.

Tepeguaje, Acacia acapulcensis, *Kunth;* Leguminosæ; in the hot districts of the western slope. The bark is rich in tannin and is astringent; the gum which exudes from the bark is used as a substitute for gum arabic.

Tepozan, Buddleia americana, *Lin.;* Scrophulariaceæ; in the Mexican valley and in many other localities. The bark and root are used in the form of decoction, in various uterine affections and as diuretics; also, the same as the leaves, for their resolvent and vulnerary properties and for relieving pain of the joints.

Tequezquite is the name given to saline efflorescences, containing sodium carbonate, and met with in different parts of Mexico. The purest is "tequezquite espumal" from the northeastern part of Lake Texcoco, and contains according to Hay, anhydrous sodium carbonate 516, sodium sulphate 153, sodium chloride 0·45, water 246, earthy matters 0·30. "Confitillo" contains 28 per cent., and "Cascarilla" 20 per cent. of sodium carbonate, both containing 30 to 35 per cent. of earthy matters. A very impure variety is "Polvillo" with 5 sodium carbonate, 1·5 sodium sulphate, 6 sodium chloride and 85 earthy matters. The article is used for alkaline baths, and for the manufacture of soap and of sodium carbonate.

Tescalama is a resinous exudation obtained from incisions made into the bark of Ficus nymphæifolia, *Lin.*, a tree growing in hot regions of the eastern slope of the Sierra Madre. It is preserved under water whereby it retains its consistence. It is used as a dressing for fractures and for various uterine affections.

Tezacpatli, Senecio præcox, *De Cand.;* Compositæ; in mountainous districts. The decoction of the leaves is vulnerary and antirheumatic.

Tianguipepetla, Illecebrum (Alternanthera, *De Cand.*) achyrantha, *Lin.;* Caryophyllaceæ; in many parts of the country. An analysis by Laso de la Vega showed the presence of a small quantity of soft resin having a nauseous taste, extractive, alkali nitrates and oxalates, &c. The decoction and the juice used freely as a drink and in the form of clysters, also cataplasms of the plant, have considerable reputation among common people for the cure of what is called burning fever. The plant is believed to be diuretic and diaphoretic.

Timbirichi, Bromelia pinguin, *Lin.;* Bromeliaceæ; in hot localities. The fruit is anthelmintic and antiscorbutic.

Tlacaxochitl, Hedyotis americana, *Cervantes;* Rubiaceæ; near the city of Mexico. The root is astringent.

Tlalpopolotl, Flourencia thurifera, *De Cand.;* Compositæ; in hot regions. The root is pectoral and vulnerary, and the resin is used as a substitute for frankincense.

Tlanepaquelite or Yerba santa, Piper sanctum, *Mociño et Sessé;* in Orizaba, Oaxaca and other states. The leaves are stimulant and are used as a condiment. By distillation the plant yields a volatile oil, heavier than water and resembling oil of sassafras.

Tlatlancuaya or Yerba del tabardillo, Achyranthes calea, *Ibañes;* Amaranthaceæ; Isúcar de Matamoros and Atlixco. Stem subsuffruticose, thick, striate when young, afterward rugose and knotty, green, somewhat bluish and spotted, with a light reddish tint between the nodes; leaves ovate-lanceolate, entire, not hairy, 8 to 12 or sometimes 22 Cm. long, and 4 to 6 or 9 Cm. broad; flowers very small, hermaphrodite and arranged in lanuginous glomerules; fruit an akene crowned by the style, the pericarp thin, membranous and in the upper half with red dots. Ibañez found in the plant fat, coloring matters, extractive, albuminoids, sugar and oxalates, nitrates, chlorides and phosphates. The plant is popularly esteemed as an excellent febrifuge; the concentrated decoction is used principally in typhus.

Tomate, Physalis pubescens, *Lin.*, Ph. peruviana, *Lin.*, and other species of Physalis (Solanaceæ) are indigenous and cultivated in Mexico, the fruit being used as a condiment and externally as an emollient.

Tomatillo, Physalis angulata, *De Cand.;* in Tabasco, Yucatan and other states. The entire plant is antiperiodic.

Tomillo, Thymus vulgaris, *Lin.*, is cultivated in Mexico, but in its place the "tomillo de Jalapa," Micromeria jalapensis, *De Cand.*, which has identical properties, is often used.

Toronjil, Cedronella mexicana, *Bentham;* Labiatæ; in Xochimilco, &c. The flowering tops are used as a substitute for melissa; they contain an abundance of volatile oil which is also employed. The same name is also applied to Cedronella pallida, *Lindley*, and Calamintha Nepeta, *Link*, of which the former is more frequently collected and has an odor resembling that of pennyroyal.

Trementina comun, obtained from incisions made into the trunk of the "ocote," Pinus Teocote, *Schlechtendal*, which grows in the mountains near the Mexican valley and in many other places. The turpentine has the consistence of a thick syrup, and ordinarily a dingy white

color, and is granular; in closed vessels it separates into two layers, the lower one being resinous and opaque, and the upper one liquid and transparent; it has a penetrating peculiar odor, and a bitter and acrid taste, is soluble in alcohol and ether, and solidifies with magnesia. The commercial article usually contains fragments of bark and other foreign substances. It yields a volatile oil, commonly called "aguarrás." It is used like other turpentines as a balsamic stimulant in doses of 0·50 to 4·8 or 15 gm.; the volatile oil in doses of 10 to 20 drops.

Tripa de Júdas, Cissus tiliacea, *Kunth;* Vitaceæ; in the Mexican valley, Morelos, &c. The decoction and the tincture of the stem have considerable reputation for the cure of rheumatism.

GLEANINGS FROM FOREIGN JOURNALS.

By Geo. H. Ochse, Ph.G.

Valuation of Ipecacuanha.—Prof. Flückiger exhausts from 10 to 20 grams of very finely powdered ipecacuanha with boiling chloroform, to which 1 c.c. of aqua ammoniæ, sp. gr. 0·920 has been added until no turbidity is produced on dropping a few drops of the chloroformic solution into acidulated water and treating with potassiomercuric iodide. The chloroform is then distilled off and the emetine, which is almost pure, is dried at 100° C. and weighed. Owing to the absence of a good crystalline salt of emetine, Flückiger prefers to weigh it instead of determining with Mayer's reagent. By dissolving the emetine in dilute acids and precipitating with ammonia or magnesia a purer article is obtainable, but he considers this unnecessary. Ipecacuanha contains on an average not much more than 1 per cent. of emetine. The seeds of Psychotria Ipecacuanha have not the remotest bitter taste and consequently contain no emetine.—*Pharm. Post,* 1886, xix, p. 55.

Properties of pure zinc.—L'Hôte obtained pure zinc by distilling a mixture of pure precipitated oxide of zinc and lampblack. Pure zinc does not generate hydrogen when boiled with water, nor is it affected by dilute sulphuric acid. When pure zinc is melted and stirred with an irod-rod, the small quantity of iron which adheres to the zinc, generates hydrogen when boiled with water and is affected by dilute sulphuric acid. Arsenic and antimony affect it similarly. All varieties of commercial zinc decompose water on boiling.—*Chemiker Zeitung,* 1886, x, p. 2.

To increase the tenacity of filtering paper, Francis draws it through nitric acid, sp. gr. 1·42, and immediately washes with water. When thus treated filtering paper shrinks somewhat and weighs slightly less; it can be washed and rubbed just like linen without losing its filtering properties. A strip of ordinary filtering paper 25 millimeters wide could not support more than 100 to 150 grams, whilst a strip treated with nitric acid supported 1·5 kilograms.—*Pharm. Zeitung,* 1886, xxxi, p. 19.

Action of sunlight on iodoform.—Daccomo states that iodoform is completely decomposed by sunlight in the presence of oxygen. The decomposition does not take place when the iodoform is kept in vacuo, or in gases which are indifferent. The reaction is as follows: $2CHI_3+5O=3I_2+2CO_2+H_2O$.—*Pharm. Zeitung,* 1886, xxxi, p. 19.

Strychnine test.—Prof. Flückiger recommends the following test as the "classical test" for strychnine: Dissolve 1 centigram of chromate of potassium in 5 c c. of water and add 15 grams (8·15 c c.) sulphuric acid of sp. gr. 1·84 at 15° C. Suspected solids are sprinkled with it on a porcelain plate, when, if strychnine is present, the characteristic blue coloration is produced. If the strychnine is in solution a distinct blue zone is obtained by dropping the suspected solution into the reagent. Several substances prevent the formation of the blue color. A mixture of equal parts of strychnine and brucine only shows the brucine (red) coloration when treated with the reagent. The strychnine test is applicable only when there is at least ten times as much strychnine as brucine present.—*Pharm. Zeitung,* 1886, xxxi, p. 10.

The lowest temperature.—Olzewski claims to have obtained a temperature of—225° C. by evaporating solid nitrogen with a pressure of only 4 millimeters of mercury.—*Pharm. Post,* 1886, xix, p. 10.

Soluble citrate of magnesium can be prepared by fusing 100 parts of citric acid in 25 parts of water by means of a water-bath, and adding 64 parts of carbonate of magnesium. Unless properly dried it loses its solubility in water.—*Schweiz. Wochenschrift,* 1886, xxiv, p. 12.

Absinthin, the bitter principle of wormwood, has been obtained in a crystalline form by Duquesnel. The crystals form colorless prisms, have no odor and are intensely bitter. Absinthin augments or restores the appetite and is purgative. It is best administered in globules, mornings and evenings, before meals.—*Répertoire de Pharmacie,* 1886, xlii, p. 15.

THE TESTS FOR ATROPINE.

By Professor Flückiger.

We are indebted to Mr. A. W. Gerrard for an interesting paper on "A New Reaction and Test for Atropine and the Mydriatic Alkaloids," published in the *Pharmaceutical Journal*, vol. xiv (1884), pp. 718 and 729. It was shown by the author that the mydriatic alkaloids are possessed of a quite exceptional alkaline power towards mercuric chloride, from the aqueous solution of which they precipitate mercuric oxide, the other natural alkaloids giving no precipitate at all with mercuric chloride, or, at least, in no case separating mercuric oxide. Mr. Gerrard's statements were confirmed by Dr. Schweissinger,[1] of Heidelberg, who moreover ascertained that hyoscyamine shows the same behavior, but not homatropine. As to my own experience, I likewise found Mr. Gerrard's results to be correct. One milligramme of atropine dissolved in 1 c cm. alcohol (0·830 specific gravity) yields a yellowish precipitate as soon as 1 c.cm. of a decinormal solution of mercuric chloride (27·1 gm. in 1 litre of water) is added. On standing for an hour or two the precipitate (an oxychloride of mercury) turns red, and proves to consist finally of mercuric oxide.

The same precipitate fails to make its appearance if other alkaloids are used. Thus, for instance, a saturated aqueous solution of codeine may be boiled with mercuric chloride without affording a precipitate of mercuric oxide; on cooling a white or whitish compound of the alkaloid and the chloride crystallizes in the liquid.

In a paper contained in the *Archiv der Pharmacie*, vol. ccxxii (1884), 605, I examined the action of phenolphtaleïn on alkaline substances, and stated that alkaloids are unable to produce the same red coloration with solutions of phenolphtaleïn as the inorganic alkalies. In repeating now these experiments I may even add that the same fact applies to so eminently an alkaline substance as pyridine. Litmus paper turns intensely blue if moistened with pyridine, but paper imbued with a solution of phenolphtaleïn (0·318 in 50 c cm. alcohol and 50 c cm. water) is not reddened by pyridine.

E. Léger[2] made a curious application of this behavior of alkaloids. He titrates sulphate of quinine by means of soda or potash, using

[1] *Pharmaceutische Zeitung*, 1884, No. 79, Supplement, October 1; also in the *Archiv der Pharmacie*, ccxxii (1884), 827. See also Amer. Jour. Phar. (1884), p. 206.

[2] *Journal de Pharmacie et de Chimie*, xi (1885), 425.

phenolphtaleïn as an indicator. One molecule of either soda or potash, as required for replacing one molecule of quinine, will not act on phenolphtaleïn, because the alkaloid set at liberty does not produce the red coloration. But the least excess of soda or potash will immediately be indicated by the red color due to the action which now sets in between soda (or potash) and phenolphtaleïn.

In my first investigation, when I stated that the alkaloids were devoid of action on phenolphtaleïn, I had not tried atropine, but now I am astonished to see that this alkaloid, quite exceptionally, is able to impart a red coloration to phenolphtaleïn paper, thus contradicting my first assertion that alkaloids generally were deprived of such an action. This new experiment of mine is very remarkable, inasmuch as it is in perfect accordance with Mr. Gerrard's test. He has pointed out that atropine (and its congeners) is more powerfully alkaline than mercury, whereas other alkaloids are unable to take the place of mercury in the mercuric chloride. With regard to phenolphtaleïn I have likewise demonstrated that atropine is the only alkaloid—speaking, however, simply of the more generally used alkaloids—which displays the same action as the inorganic alkalies. Certainly, this is a very remarkable coincidence, speaking much in favor of the suggestion that atropine must be somewhat particularly constituted, differing from other solid alkaloids, none of which, as far as we actually know, shows the same behavior towards mercuric chloride or phenolphtaleïn. I have also tried some other coloring matters, viz., cyanine, methyl-orange, phenacetolin, tropæolin, and found them to be acted upon by atropine in the same way as by soda or potash. Mercurous chloride (calomel), however, is not blackened by atropine as it is by soda, potash, or ammonia, and also by pyridine.

It remained to be ascertained that the above-mentioned reactions of atropine were not due to traces of inorganic alkalies, a slight admixture for instance of carbonate of sodium or potassium. But a little of the atropine under examination burnt in a platinum crucible yielded no residue at all, nor did a solution of phenolphtaleïn assume any coloration when I afterwards filled the crucible with it. It might therefore be granted, that my specimen of atropine was fairly pure.

In conclusion, we have proved, Mr. Gerrard, Dr. Schweissinger, and myself, that atropine (and hyoscyamine—Dr. Schweissinger) has an alkaline power like the hydrates of sodium or potassium, differing in this respect from (probably all) other alkaloids.

The reactions just alluded to may as well be used in the identification of atropine. I have modified and completed the other tests for the said alkaloid in the following way:

I. One milligram of atropine and about the same quantity of nitrate of sodium are rubbed together by means of a glass rod, the top of which is to be moistened with very little sulphuric acid (1·84 sp. gr.); this may best be performed on a porcelain dish or slab. Then a little sodium hydrate is rubbed in a mortar with absolute alcohol, so as to form a saturated solution. If this is poured drop by drop on the oxidized alkaloid, a red or violet color is developed.

II. Nitrite of sodium, instead of nitrate, applied in the same way as above, yields an orange mixture, turning red, violet, or lilac, if it is gradually diluted by an aqueous solution of hydrate of sodium, about 1·160 sp. gr.; the caustic lye is to be added in excess.

III. Atropine may be heated to the boiling point in a mixture of one volume of glacial acetic acid and one volume sulphuric acid (1·84 sp. gr.) without any coloration. At last the boiling liquid begins to display a well marked green-yellowish fluorescence. After cooling, the liquid evolves the odor of acetic acid, but besides a very pleasant aromatic smell is distinctly perceptible.

I may add, moreover, that hyoscyamine as well as homatropine show the same behavior as atropine with regard to phenolphtaleïn. The most conclusive way for demonstrating this fact is to place one milligram, or even much less, of the alkaloid on phenolphtaleïn paper. Then add one drop of alcohol, 0·81 sp. gr. or absolute; no coloration at all will be noticed. Allow the alcohol to evaporate and then touch the alkaloid with a drop of water. Now the brilliant red coloration will immediately make its appearance; it disappears as soon as alcohol is again applied, and reappears when the latter is allowed to evaporate.

Dr. Schweissinger stated homatropine to be devoid of action on mercuric chloride. In my experiments, however, I ascertained that it perfectly agrees in that respect with atropine, whereas hyoscyamine did not yield a precipitate in the solution of mercuric chloride.

Lastly, I thought it interesting enough to try also *cocaïne*. The alkaloid produces a blue coloration on litmus paper if moistened with either water or alcohol, but it does not partake of the power of reddening phenolphtaleïn paper. As to mercuric chloride, cocaïne immediately affords a very abundant purely white precipitate. But it

would be impossible to investigate its composition inasmuch as it very soon turns red as in the case of the mydriatic alkaloids.

Thus, mercuric chloride as well as phenolphtaleïn are to be considered as very valuable tests for alkaloids.—*Strassburg, Germany.—Pharm. Jour. and Trans.*, January 16, 1886, p. 601.

CUPREINE AND HOMOQUININE.

By Dr. O. Hesse.

Dr. Hesse, in repeating the experiments published in this Journal by Paul and Cownley,[1] found that caustic lime acts upon homoquinine salts in the same way as caustic soda, but that it was advantageous to boil the precipitated alkaloid with excess of caustic lime in order to extract the whole of the cupreine. By boiling a suitable bark with caustic lime the cupreine could be also extracted at once, but it was then associated with another alkaloid, from which the cupreine had to be separated in the form of neutral sulphate. The yield thus obtained was very small, and for that reason Dr. Hesse preferred to prepare cupreine by operating upon the quinine sulphate obtained in the ordinary way from cuprea bark. This was dissolved with dilute sulphuric acid, an excess of caustic soda added, and the quinine separated by ether. The alkaline liquor was then heated and neutralized with sulphuric acid, and the cupreine sulphate crystallized out. The sulphate was treated with ammonia and hot ether, and as the solution cooled the cupreine crystallized out. The crystals were then digested with chloroform to remove a remaining trace of quinine, and the undissolved portion recrystallized from boiling alcohol or dissolved with dilute sulphuric acid, excess of ammonia added, and the mixture shaken with ether sufficient to dissolve the alkaloid. After a time cupreine separates from the ether solution in groups of concentric prisms, which contain two molecules of water, while the crystals obtained from an alcohol solution generally contain somewhat less water. Analysis gave results agreeing with the formula $C_{19}H_{22}N_2O_2$. The crystallized alkaloid does not lose all its water at 100°, but only when heated to 120° or 125° C. In a perfectly dry state cupreine melts at 198° C. It is but sparingly soluble in ether or chloroform, more so in alcohol. An alcohol solution has a strong basic reaction; it acquires a dark reddish-brown color with ferric chloride, and an intense dark green color on

[1] *Pharm. Jour.*, [3], xv, 221. See Amer. Jour. Phar. (1884), p. 575, and (1885), p. 249.

addition of chlorine and ammonia. The solution in excess of dilute sulphuric acid shows no fluorescence; with ammonia it gives a flocculent precipitate that is sensibly soluble in excess of ammonia and readily dissolved by caustic soda. The alkaloid can be axtracted from the ammonia solution by ether, but not from the soda solution, provided there is some excess of soda present. After adding to such a solution sufficient ammonium chloride to convert the caustic soda into chloride the alkaloid can be dissolved out by ether.

Cupreine is lævorotatory; it is a strong base, neutralizes acids perfectly, forming salts, having a neutral reaction, that dissolve in hot water with a yellow coloration. The acid salts give colorless solutions. The following salts have been examined and described by Dr. Hesse:

Cupreine Sulphate $(C_{19}H_{22}N_2O_2)_2H_2SO_4+6H_2O$ crystallizes in minute white needles, very difficultly soluble in cold water, and insoluble in a saturated solution of sodium sulphate.

The acid sulphate, $C_{19}H_{22}N_2O_2,H_2SO_4+H_2O$, crystallizes in prisms with numerous faces; it is sparingly soluble in cold water, readily soluble in hot water.

Cupreine Hydrochlorate $(C_{19}H_{22}N_2O_2,HCl+H_2O)$ crystallizes in small needles, moderately soluble in cold water, less readily in sodium chloride. The solution acquires an intense dark-brown color when mixed with ferric chloride.

The acid salt $C_{19}H_{22}N_2O_2(HCl)_2$ forms anhydrous prisms of a yellowish color, moderately soluble in cold water and sparingly soluble in hydrochloric acid.

Cupreine Tartrate $(C_{19}H_{22}N_2O_2)_2C_4H_6O_6+H_2O$ forms delicate white needles, very sparingly soluble in cold water. The crystals effloresce in dry air.

Cupreine Sulphocyanate.—A hot solution of the neutral hydrochlorate becomes turbid when mixed with a moderately dilute solution of potassium sulphocyanide, and gradually concentric groups of acicular crystals are separated as the turbidity disappears. The salt is very sparingly soluble in solution of potassium sulphocyanide, and is precipitated in an oily form by an excess.

Platinum salt $(C_{19}H_{22}N_2O_2)_2PtCl_6H_2+4H_2O$.—A solution of neutral cupreine hydrochlorate gives with solution of sodium platinochloride a yellow flocculent precipitate that is very sparingly soluble in cold water. When heated, this salt assumes a dark green color before burning.

The acid salt, $C_{19}H_{22}N_2O_2PtCl_6H_2+H_2O$, is obtained as a yellow

flocculent precipitate when a solution of the hydrochlorate is mixed with platinum chloride. The precipitate soon changes into small flat needles, very sparingly soluble in hot water, more readily in dilute acid. The water of crystallization is not entirely driven off under 130° C.

Cupreine combines with bases as well as with acids. For complete solution in caustic soda or caustic potash a slight excess of caustic alkali is requisite, and Dr. Hesse considers that this is owing to the relative solubility of the compounds formed. When equal molecular proportions of cupreine and soda or potash are mixed and the solution shaken with ether a small portion of the alkaloid, from $\frac{1}{8}$ to $\frac{1}{10}$ is dissolved by the ether, but this may be prevented by using some excess of alkali.

The potash compound is very soluble in water; on evaporating the solution or on adding caustic soda it separates in a gelatinous state.

The soda compound is similar to the above; when mixed with excess of of caustic soda and warmed the jelly dissolves, and on cooling colorless crystalline laminæ of a silky lustre are formed.

The lime compound.—When a solution of the potash compound is mixed with calcium chloride a copious precipitate of the lime compound is formed. It is moderately soluble in boiling water, but little in cold water. The hot solution becomes gelatinous on cooling.

The compound with lead oxide is formed when a solution of the soda compound is mixed with an equivalent quantity of lead acetate solution as a yellow flocculent precipitate that is very sensibly soluble in cold water and has a strong alkaline reaction.

The compound with silver oxide is obtainable in a similar manner as a yellow flocculent precipitate that is moderately soluble in cold water. This solution has a strong alkaline reaction.

The foregoing results led Dr. Hesse to the opinion that cupreine might contain phenolhydroxyl, and that by the action of acetic anhydride a derivative might be obtained, in which the phenol character was extinguished. To determine this point, which turned out to be as he anticipated, dry cupreine was mixed with acetic anhydride, in which it dissolved after heating to 85° C. for some time. When the reaction had been continued a few hours water was added, and the liquid almost neutralized by careful addition of ammonia. By precipitating the base with ammonia and dissolving it in ether colorless hexagonal plates were obtained on evaporation, consisting of diacetyl-

cupreine, $C_{19}H_{20}(C_2H_3O)_2N_2O_2$. The crystals of this substance are anhydrous; it melts at 88° C., dissolves with moderate ease in alcohol and ether, very readily in chloroform. The spirit solution has a strong alkaline reaction; it gives no color with ferric chloride, but with chlorine and ammonia it becomes dark green. The base is dissolved by dilute acids, and is precipitated on addition of ammonia or soda; by contact with caustic soda it is converted in a few minutes into acetic acid and cupreine.

Diacetylcupreine Hydrochlorate ($C_{19}H_{20}(C_2H_3O)_2N_2O_2HCl$).—This salt has the form of hexagonal plates; it is very soluble in water or alcohol; the solution gives no color with ferric chloride. With platinum chloride an amorphous precipitate is formed that is very sparingly soluble in cold water.

The previous observation that homoquinine when heated to 140° C. with hydrochloric acid (1·125 specific gravity) in a closed tube is converted into methyl chloride and apoquinine led Dr. Hesse to expect apoquinine only would be formed by acting upon cupreine in the same way. He found that to be the case.

By comparing the formulæ representing the composition of cupreine and of quinine it is evident that quinine stands in the relation of a methyl ether of cupreine, or that it differs from cupreine by containing the elements of methyl in place of hydrogen, as shown by the following:

Cupreine.	Quinine.
$C_{19}H_{20}N_2\begin{cases}OH\\OH\end{cases}$	$C_{19}H_{20}N_2\begin{cases}OCH_3\\OH\end{cases}$

It is therefore conceivable that cupreine might be convertible into quinine by a substitution of methyl for hydrogen, according to the following equation:

$$C_{19}H_{21}MN_2O_2+C_3HI=MI+C_{19}H_{21}(CH_3)N_2O_2.$$

The experiments made to effect this substitution were not successful in producing quinine, though repeated with various modifications several times. In one instance cupreine was dissolved in water with a molecular proportion of caustic soda and then mixed with silver nitrate. Cupreine silver was thus formed and precipitated in yellow flocks. A molecular proportion of methyl iodide dissolved in alcohol was then added and the mixture heated in a closed vessel. Reaction soon took place and silver iodide was formed, the solution becoming deep yellow. After twelve hours the liquid was filtered and evaporated

to remove spirit; the residue had a strong alkaline reaction and was extracted with ether which dissolved only a minute quantity of cupreine. The remaining alkaline liquid was neutralized with hydrochloric acid and mixed with potassium iodide solution which gave a precipitate of methyl cupreine iodide. This compound can be obtained more readily by mixing an alcoholic solution of cupreine with methyl iodide. After a short time methyl cupreine iodide separates from the solution almost entirely and can be obtained pure by a crystallization from boiling water. It forms small colorless needles which are anhydrous, very sparingly soluble in cold water or alcohol and insoluble in ether, but very soluble in acids and alkalies. The iodide is not sensibly altered when a solution in caustic alkali is boiled for a long time, and on neutralizing the solution it is again precipitated, but of a slight yellow color. Its composition is represented by the formula $C_{19}H_{22}N_2O_2CH_3I$. The corresponding chloride was obtained by digesting the iodide with freshly precipitated silver chloride and hot water. On cooling the solution it crystallized in small needles, sparingly soluble in cold water, readily in hot water with yellow color. The solution becomes dark reddish-brown with ferric chloride, with very little chlorine and ammonia dark green. The salt is readily soluble in acids and alkalies, but gives no fluorescence. The platinochloride $C_{19}H_{22}N_2O_2.CH_3,PtCl_6H+H_2O$ is an orange-colored crystalline precipitate slightly soluble in water.

The neutral sulphate $(C_{19}H_{22}N_2O_2.CH_3)_2SO_4$ was obtained by digesting the iodide with silver sulphate and hot water. By evaporating the yellow solution the sulphate crystallized in small needles, very soluble in cold water, and giving the above-mentioned reactions with ferric chloride and chlorine and ammonia.

The base was obtained by adding baryta water to a hot solution of the sulphate. On evaporation the base remains as a yellow amorphous mass; it is very bitter, insoluble in ether, very soluble in water. The solution has a strong alkaline reaction; when mixed with a small quantity of ferric chloride hydrated ferric oxide is at first precipitated and re-dissolved on adding more ferric chloride, the solution becoming dark reddish-brown. The solution of the base mixed with excess of chlorine becomes of a fine deep red color on the addition of ammonia, but with only a small quantity of chlorine a green color is produced. The base dissolves in excess of dilute sulphuric acid without fluorescence, but in alcohol with bluish-green fluorescence. It is

readily soluble in caustic soda and when heated with an excess did not appear to be much altered.

In these compounds of methyl cupreine the phenolhydroxyl maintains its full influence; but there was reason to expect that by suitable treatment they might be converted into methylcupreine methyl or quinine methyl compounds after the manner represented by the following equation:

$$C_{19}H_{21}MN_2O_2.CH_2I + CH_3I = MI + C_{19}H_{21}(CH_3)N_2O_2,CH_3I.$$

But experiment did not confirm this anticipation and on the contrary dimethylcupreine compounds were obtained. In operating with the silver compound dimethylcupreine hydroxide was easily obtained, a highly basic substance giving a reddish-yellow solution in water. When slightly supersaturated with hydrochloric acid and mixed with potassium iodide solution dimethylcupreine iodide crystallized out in brilliant reddish-yellow laminæ, sparingly soluble in water, readily in acid, alkalies and alcohol, having the composition represented by the formula $C_{19}H_{22}N_2O_2(CH_3I)_2 + 5\,H_2O$.

The attempts to effect a synthesis of quinine or its methyliodide compound having so far failed the sodium compound of the iodide was again subjected to the action of methyl iodide in closed tubes at 100° C. The solution thus formed was dark brown; it had no basic reaction, and when mixed with water deposited a brown resinous substance. As sodium iodide was formed this resin might perhaps have been dimethylquinine iodide, but it did not appear to be that compound. It dissolved readily in caustic soda and in dilute acids, and undoubtedly contained phenolhydroxyl still unaltered. In any case Dr. Hesse is of opinion that the hydrogen of the phenolhydroxyl present in cupreine offers great resistance to the substitution by methyl.

Dr. Hesse then proceeds to discuss the nature of homoquinine, and in reference to the opinion expressed by Paul and Cownley that the differences presented by it from cupreine and quinine and by the corresponding salts may be taken as indications that homoquinine is a distinct alkaloid, he puts forward the view that these differences may be due to the combination of quinine with cupreine. Hence he thinks that the ready solubility of homoquinine in alcohol and the impossibility of obtaining it from this solution in any other than the amorphous condition is not surprising, and further, that the appearance and behavior of some homoquinine salts also furnish as little evidence of the individuality of homoquinine.

Dr. Hesse considers that cupreine being a diamine base, is therefore biacid, and that it is also in virtue of its phenol nature monobasic. Hence it can combine with two molecules of a monobasic acid, and also with one atom of a metal, such as K or Na. When either of the latter compounds is brought together with an equivalent quantity of quinine hydrochlorate a precipitate is formed that consists essentially of homoquinine.

$$C_{19}H_{21}NaN_2O_2+C_{20}H_{24}N_2O_2,HCl=NaCl+C_{20}H_{24}N_2O_2,C_{19}H_{22}N_2O_2.$$

Dr. Hesse considers that this simple mode of forming homoquinine proves that the substance is only a compound of quinine and cupreine in equal molecular proportions, and he refers to his analytical results as to the amount of quinine in homoquinine as being in harmony with this view.

Lastly, the hydration of crystallized homoquinine has been redetermined by Dr. Hesse, and he finds it amounts to 10·38 per cent. as against 10·19 calculated in accordance with the formula—

$$C_{20}H_{24}N_2O_2,C_{19}H_{22}N_2O_2+4H_2O.$$

—*Pharm. Jour. and Trans.*, January 23d, 1886, pp. 622–625.

A NEW LOCAL ANÆSTHETIC.

At a recent meeting of the Medical Society of Berlin, Dr. Lewin presented a most interesting series of observations upon the physiological effects of a resinous extract obtained from the root of *Piper methysticum*, which is soluble in alcohol, possesses a somewhat aromatic taste, and leaves upon the tongue a sensation of pricking and burning, soon lost in the supervening local insensibility. When the extract, even in very small amount, is instilled into the eye of an animal, a slight local irritation is evidenced by repeated blinking, which soon yields to a marked, enduring, and complete insensibility of the conjunctiva and cornea. In guinea-pigs Lewin has seen this insensibility continue for more than an hour, normal sensation gradually returning. The iris retains throughout its reflex responsiveness to optic stimuli. No anatomical lesions of the cornea or conjunctiva were observed as the result of its application.

When the solution of the extract is injected hypodermically, the tissues with which it comes in contact completely cease to respond to the application of thermic, electric, and chemical stimuli—a transitory condition which is followed by no symptoms of inflammation.

In regard to the constitutional effects produced by the drug upon man, much the same claims are put forward as in the case of coca. When used in moderate amounts, a feeling of comfort, contentment, and rest, with complete retention of consciousness and reason, is said to result. With large doses there is a sensation of dreamy happiness, with an intense desire for sleep; while in excess the infusion causes nausea, headache, paresis of the extremities, nervous trembling, and somnolence. The general effect upon birds, rabbits, and cats is analogous to that produced in man.

It is evident that the drug is of considerable importance, and, if further experience shows that it effects in man the prolonged local anæsthesia that it induces in animals, it will be of great utility in very many operations in minor surgery.—*Med. News*, February 13, 1886.

DERIVATIVES OF SANTONIN.

By V. Villavecchia.

Photosantonic acid, $C_{15}H_{22}O_5$, is best obtained by exposing a solution of 10 grams santonin in a liter of acetic acid (sp. gr. 1·06) to the action of light for about a month; the product is evaporated to a syrupy consistence in a vacuum, the residue washed with water, and then treated with a warm solution of sodium carbonate. The undissolved residue may be dissolved in alcohol, from which it crystallizes in prisms, melting at 182–183°, and of the composition $C_{17}H_{22}O_5$, namely, 1 mol. santonin + 1 mol. acetic acid. On adding hydrochloric acid to the sodium carbonate extract, photosantonic acid separates, and is purified by repeated crystallization from alcohol. Its properties agree with those assigned to it by Sestini (1877). It loses 1 mol. H_2O at 100°, and melts at 154–155°. The composition of its salts indicates that the water lost at 100° is not water of crystallization as assumed by Sestini, but that undried photosantonic acid bears the same relation to the dried acid, as santonin does to santonic acid. Barium and silver photosantonates, $C_{15}H_{20}O_5Ba$ and $C_{15}H_{20}O_5Ag_2$, are described.

Photosantonin, $C_{17}H_{24}O_4$, is best prepared by exposing a solution of santonin (20 grams) in alcohol (1 litre) to the direct action of light for three months. The alcohol is distilled off in a vacuum, and the thick residual oil treated with lukewarm sodium carbonate solution to remove photosantonic acid. On treating the insoluble portion with

ether, two isomeric photosantonins, $C_{17}H_{24}O_4$, are obtained; one modification forms platy crystals, melting at 154–155°, and is dextrorotatory; $[\alpha]_D = +76{\cdot}77°$ for a solution containing 0·3825 gram in 50 c.c. alcohol at 13°. The other modification, which is the chief product, melts at 68–69°, and is identical with Sestini's photosantonin. It is readily soluble in alcohol and ether, and almost insoluble in cold water; $[\alpha]_D = -121{\cdot}6°$ for a solution containing 1·0010 gram in 50 c.c. alcohol at 14°, and $-118{\cdot}4°$ for 1·0980 gram in 50 c.c. alcohol also at 14°. The composition of photosantonin shows that it is not the diethyl salt of photosantonic acid as Sestini assumed, but the monethyl-derivative of dehydrated photosantonic acid, which is regarded as a lactonic acid, thus:—Photosantonic acid, $HO{\cdot}C_{13}H_{19}(COOH)_2$; photosantonic acid dried at 100°, $COOH{\cdot}C_{13}H_{19}\langle{}^{-O-}_{CO}\rangle$; photosantonin, $COOEt{\cdot}C_{13}H_{19}\langle{}^{-O-}_{CO}\rangle$. The last compound may also be obtained from photosantonic acid, alcohol, and sulphuric acid, and by the action of ethyl iodide on the silver salt.

When gaseous hydrogen chloride is passed into a solution of photosantonic acid in absolute alcohol, the diethyl-derivative of an acid containing the elements of a molecule of water less than photosantonic acid is obtained; it is termed *ethyl dehydrophotosantonate*, $C_{13}H_{18}(COOEt)_2$, and forms a colorless liquid, which does not solidify at −10°. A solution of 0·7306 gram in 25 c.c. alcohol has a dextrorotatory power at 20·4°, $[\alpha]_D = +20{\cdot}4°$. The free acid which is isomeric with dehydrated photosantonic acid, melts at 132–133°. It is very readily soluble in alcohol and ether; its dextrorotatory power is $[\alpha]_D = +31\ 9°$ for a solution containing 0 7114 gram in 50 c.c. alcohol. The barium salt, $C_{15}H_{18}O_4Ba$, is very readily soluble.—*Jour. Chem. Soc.*, 1886, p. 73; *Berichte D. Ch. Ges.*, 1885, pp. 2859–2864.

Carbon Disulphide in Neuralgia.—Gasparini (*Gazz. med. Ital-Lomb.*), records 16 cases of neuralgia treated with this remedy, applied locally. Neuralgias from mechanical causes, from malarial infection, and from poisoning by metals, are not under consideration. The cases treated were such as pure facial neuralgia, pleurodynia and sciatica. The method of treatment is as follows:—A small piece of cotton wool on which 10-12 drops of the disulphide have been poured is at once applied to the painful spot, and covered with another piece of cotton wool, which may be held there till the neuralgia is relieved. The pain produced by the application is intense, and the relief obtained is doubtless from the nerve affected being stunned. In some of the cases a permanent cure resulted; in all there was amelioration of the pain.—*Med. Chronicle*, December, 1885, p. 227.

ON NEW PULMONARY MEDICAMENTS.[1]

By Prof. Dujardin-Beaumetz, of Paris, France.
(A Clinical Lecture delivered in Cochin Hospital.)

Gentlemen:—I shall occupy this lecture with a brief consideration of three new pulmonary medicaments: *Euphorbia pilulifera*, *terpin*, and *terpinol*.

The best antiasthmatic medication is surely that of which the basis is iodide of potassium, and when Green in 1860, Aubree in 1864, Trousseau in 1869, and, more emphatically still, Germain Sée in 1878, made known the happy effects of this remedy in the treatment of asthma, they rendered to medicine a signal service; you can, in fact, see any day in our wards cases illustrating the truth of this affirmation.

You know very well how we formulate this treatment; we begin by moderate doses of seven or eight grains and gradually increase them to thirty, forty and even sixty grains a day. I am in the habit of ordering the iodide of potassium to be taken in milk, directing my patients at the same time to drink a great deal of milk during the day. We must, in fact, to prevent accumulation of the medicament favor its elimination by the urine. While continuing the usage of milk, I think that the best vehicle for the administration of iodide of potassium is ale, which, in my opinion, disguises its taste better than anything else. We are in the habit, then, of ordering the patient to take at meal-time, in a tumblerful of bitter ale, a dessertspoonful or a tablespoonful of the following solution:

℞.—Iodidi potassii, - - - - - ℥iij,
Aquæ, - - - - - - ℥vj.—M.

I sometimes add to the above tincture of lobelia, in the proportion of two or three fluidrachms to the entire quantity; if, however, the lobelia causes nausea, it must be omitted from the prescription.

Despite all your precautions and all your endeavors to make the iodide palatable and well tolerated, there will be persons who cannot support it, and who cannot take it in the smallest doses without suffering many of the symptoms of iodism. Therefore succedanea to iodide of potassium have been sought for, and among these I must make special mention of *Euphorbia pilulifera*. This plant has been especially studied in our hospital service by Dr. Marsset.[2] Euphorbia pilulifera belongs to the great family of Euphorbiaceæ, which has

[1] Translated, from advance sheets, by E. P. Hurd, M. D., of Newburyport, Mass.
[2] Marsset: On Euphorbia Pilulifera, *Therapeutic Gazette*, Feb., 1885, p. 92; Thèse de Paris, 1884.

furnished to medicine very energetic purgatives, such as croton tiglium and caper spurge; it is an herbaceous annual plant, growing in Brazil and other tropical countries, and in Australia; the specimens which served for our clinical experiments came from Queensland, Australia.

The active principle is an acrid resin which is soluble in water and dilute alcohol. When the aqueous extract or the hydro-alcoholic extract is administered to animals, such as frogs or guinea-pigs, it is observed that in the case of frogs this extract is toxic in the dose of ten to fifteen centigrams, which corresponds nearly to five grams of the dried plant to one hundred grams of the weight of the animal. In the guinea-pig the toxic dose is less; the animal succumbing to a dose of fifty or sixty centigrams of the extract, equivalent to about one gram of the dried plant per one hundred grams of the animal's weight.

When we come to inquire into its physiological effects, we note that it acts chiefly on the respiratory apparatus, and that to a period of acceleration succeeds a period of retardation of the respiratory movements and beatings of the heart; hence, it is probable that this medicine acts directly on the respiratory and cardiac centers.

Dr. Mattheson, in 1884, was the first to call attention to the action of euphorbia pilulifera in the treatment of asthma, and Dr. Tison, of France, was the first to utilize this property in dyspnœas of asthmatic and even of cardiac origin.

From a pharmaceutical point of view you may make use of the following preparations: (1) The hydro-alcoholic extract of the plant, which may be given in the dose of ten centigrams (one and two-thirds grains) a day; (2) or, the decoction, which Dr. Tison directs to be prepared by steeping half an ounce of the dried plant in two quarts of water, the dose to be three or four wineglassfuls a day. (3) I am myself in the habit of using the tincture, of which I give ten drops three times a day. I recommend you to cause this preparation to be taken shortly before meal-time in a cup of some aromatic infusion, such as polygala or wall pellitory. You will thus avoid the local irritant action which characterizes almost all the extracts of this spurge. (4) There exists, lastly, a syrup made by Petit, which contains five centigrams of the extract in each tablespoonful.

In patients suffering from dyspnœa, whether resulting from simple asthma, or from pulmonary emphysema, or even a cardiac affection, euphorbia has sometimes given us good results, but it will not do to

give too large doses, and of the tincture, from five to ten drops, before each of the principal meals, are enough. Notwithstanding all these precautions, you will not be able to keep up this treatment more than a week without interruption, for the patients are apt to experience a burning sensation in the stomach, which results from the local irritant action of the medicament. It is, therefore, chiefly as a succedaneum of iodide of potassium, when the latter cannot be well borne, that you will resort to euphorbia pilulifera.

Terpin and terpinol fulfill indications absolutely different, and are applicable in catarrhs of the lungs. In my *Clinical Therapeutics* I have insisted on the great advantages which may be derived from copaiba in the treatment of pulmonary catarrh, but this medication can have but limited application; for, to say nothing of the repugnance which many patients have toward copaiba, and its unfortunate association in the minds of most people with gonorrhœa (which increases the prejudice against it), there are certain unpleasant physiological effects often attendant on its use, such as eructations, diarrhœa and divers cutaneous eruptions, which militate against the usefulness of this drug.

Therefore, while recognizing how happily copaiba modifies expectoration, it is only in hospital practice that I apply this excellent medicament to the treatment of pulmonary catarrh. I believe that I have found in terpinol a very fortunate substitute for copaiba, and one which offers all the advantages of the latter without any of its disadvantages.

When turpentine is distilled in presence of an alkali, there is obtained a special hydrocarbon having for formula $C_{10}H_{16}$; this is *terebinthene*, which undergoes hydration, and thereupon furnishes a white, solid, crystalline body, which is the *bihydrate of terebinthene*, or *terpin*. This terpin, in presence of an acid, such as sulphuric or hydrochloric, is transformed into an oily body, to which has been given the name of *terpinol*.

Terpin was employed for the first time in therapeutics by Prof. Lepine, of Lyons, and, as a result of experiments on man and animals, he found that this body might be with advantage substituted for turpentine, and that it acted as expectorant and diuretic; his dose of terpin is twenty to sixty centigrams (three to ten grains). We have reproduced in our service the trials of Prof. Lepine, and our pupil, Dr. Guelpa, has interested himself particularly in this undertaking. Terpin presents a real inconvenience in its slight solubility,

requiring, as it does, 200 parts of cold water to dissolve one part of this substance; therefore, it is necessary to have recourse to alcohol in order to obtain active solutions; which is a drawback when one desires to prescribe it for diuretic purposes.

We have given terpin in much larger doses than M. Lepine; we have administered one, two, and even three grams a day without obtaining any well-marked diuretic effect; so, in accordance with Tanret s suggestion, we have substituted terpinol for terpin.

Terpinol is an oily liquid body, which gives forth a very strong odor of tuberose (Polianthes tuberosa), and especially of gardenia (cape jasmine). Adrian has made for me capsules with terpinol, each containing ten centigrams (one and two-thirds grains), and we give our patients six, eight, ten and even twelve of these capsules a day. Terpinol may also be given in pill form, and here we give Tanret's formula, which can hardly be improved upon: Take of terpinol, benzoate of sodium, of each, ten centigrams (one and two-thirds grains), sugar, q. s. for one pill. These pills contain the same quantity of terpinol as the capsules.

We have made several experiments on animals, and have noted:—(1) The rapid elimination by the respiratory passages of terpinol, which long imparts its special odor to the breath; (2) Its feeble elimination by the urine, which also gives forth the odor of terpinol, though much less markedly than the breath.

We then made trials of terpinol in two orders of complaints—pulmonary catarrh and affections of the urinary passages. As might have been foreseen, it was in pulmonary catarrh that we obtained the best results, since it is chiefly by the pulmonary surface that terpinol is eliminated. The sputa become more fluid, their bad odor disappears, and expectoration is facilitated. In affections of the urinary organs, the results have been almost nil. As a diuretic and modifier of the urine, it has shown itself very much inferior to turpentine.

So that if we were to attempt to classify these three substances, turpentine, terpin and terpinol, according to their therapeutic effects, we should say that for the catarrhal affections of the bronchi, terpinol deserves the first place and turpentine the last, while in the case of catarrh of the urinary organs, the order is exactly the reverse. This completes what I have to say at present on the subject of new pulmonary medicaments and antiseptic medications.—*Medical News*, Feb. 20, 1886.

TERPENES.

By O. Wallach.

Pure borneol, prepared by the action of sodium on camphor, melts at 206–207°, not at 198° as generally stated. This compound behaves like a saturated secondary alcohol, but it has the property of uniting with bromine and hydrogen bromide, etc., to form unstable additive products. For example, when bromine is added to a solution of borneol in light petroleum, a crystalline precipitate is deposited, which consists chiefly of *borneol bromide*, $C_{10}H_{18}O \cdot Br_2$, mixed with a small quantity of $(C_{10}H_{18}O)_2Br_2$. Cineol, like borneol, unites with bromine in two different proportions, forming compounds which have the same composition as the borneol bromides. When borneol bromide is covered with light petroleum and left for some time in a closed vessel, decomposition ensues resulting in the formation of borneol and borneol hydrobromide, $(C_{10}H_{18}O)_2,HBr$. The same compound is obtained as a white, crystalline powder by the action of hydrogen bromide on a solution of borneol in light petroleum. It is decomposed by water and alcohol.

The *hydriodide*, $(C_{10}H_{18}O)_2$, HI, is a white, crystalline compound, which decomposes spontaneously.

Bornyl chloride, $C_{10}H_{17}Cl$, is easily prepared by adding borneol to a mixture of phosphorus pentachloride and light petroleum. The action is finished in half an hour. The crude product is poured into water, and repeatedly washed. Bornyl chloride is not identical with pinene hydrochloride. It is readily converted into camphene by heating with aniline. Camphene is decomposed by dehydrating agents, such as zinc chloride and strong sulphuric acid, or by the action of heat alone. In each case the decomposition products are liquid. Monobromocamphene is obtained as an oily liquid when bromine is added to a solution of camphene in alcohol and ether.

Camphene is formed by the action of dehydrating agents on borneol, but the hydrocarbon cannot be isolated (except when potassium pyrosulphate is the dehydrating agent) as it is decomposed by zinc chloride or phosphoric anhydride or strong sulphuric acid.

The so-called hydrocarbon "*borneen*," which Pelouze (*Annalen*, xl, 327), Kachler (*ibid.*, clxiv, 78), and Oppenheim (*Jour. Chem. Soc.*, 1874, 891) obtained by the action of phosphoric anhydride on borneol, is a mixture of the decomposition products of camphene.

The author confirms Tilden's statement (*Trans.*, 1878,80 and 251), that Russian and Swedish oil of turpentine contain the same constituents, namely, australene, sylvestrene, and dipentene. The hydrocarbon obtained by decomposing sylvestrene chloride with aniline closely resembles sylvestrene, but the identity of the bodies is not proved. The hydrocarbons yield a chloride melting at 72°, and a liquid bromide.

"*Terpinol*" described by Wiggers (*Annalen*, lvii, 252), and by List (*ibid.*, lxvii, 367), does not exist.

Terpin hydrate, $C_{10}H_{20}O_2+H_2O$, melts at 117°. It is a saturated compound, and is decomposed by boiling with acids or dehydrating agents, yielding terpineol, $C_{10}H_{18}O$, and other products. When a mixture of 1 part of sulphuric acid and 2 of water is used, terpineol, terpinene, $C_{10}H_{16}$, and terpinolene are formed. When very dilute sulphuric acid is used, the chief product is turpinene. Dilute phosphoric acid and glacial acetic acid on the other hand yield terpineol as the principal product. Terpin hydrate is almost completely converted into dipentene by prolonged treatment with potassium pyrosulphate.

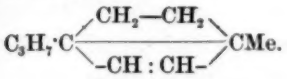
Terpineol, $C_{10}H_{17}\cdot OH$, is a nonsaturated monatomic alcohol. It is a thick liquid, boiling at 215°, and is sparingly soluble in water. It unites with bromine to form an unstable bromide.

Dipentene tetrabromide, melting at 124°, is formed by the action of an excess of bromine on terpineol. The hydroxyl in terpineol is easily replaced by chlorine or iodine, yielding for example the chloride, $C_{10}H_{18}Cl_2$, melting at 50°, and the iodide melting at 77°. Terpineol unites with carbanil, forming phenylterpinylurethane, which crystallizes in white needles melting at 110°. Boiling with dilute acids, or treatment with dehydrating agents, converts terpineol into terpene or dipentene, but if terpineol is left at the ordinary temperature in contact with dilute sulphuric or hydrochloric acid, it unites with water, forming terpin hydrate, $C_{10}H_{20}O_2+H_2O$.

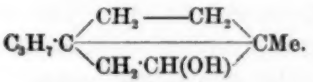
Terpin has the same boiling point as dipentene, but the two compounds are not identical, as the former yields a liquid bromine-derivative. Terpin is formed by the inversion of pinene with alcoholic sulphuric acid.

Terpinolene has not yet been obtained in a pure state. It boils between 185° and 190°, and yields an unstable tetrabromide crystallizing in monoclinic plates.

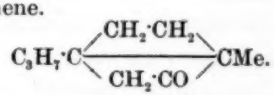
The relation between camphene, borneol, and camphor is shown by the following formulæ:—



Camphene.



Borneol.



Camphor.

Borneol bears the same relation to camphene that terpineol does to dipentene.—*Jour. Chem. Soc.*, 1886, p. 70; *Annalen*, ccxxx, p. 225-272.

MANGANESE OCCURRING IN PLANTS.

By Professor Flückiger.

It is well known that manganese is widely spread throughout the vegetable kingdom, although it always occurs in very small amount. No doubt there are certain plants provided with the power of absorbing the said metal, whilst others would appear to be unable to assimilate manganese. It is true that much more striking facts of a similar order are to be noticed with regard to iodine. Among marine plants there are none superior to the *Laminariæ*, which are so well known as an important source for iodine, or at least were so for a long time. I have ascertained that 5 grams of *Laminaria Cloustoni* (or *L. hyperborea*) are quite sufficient for demonstrating the presence of iodine in its tissue. The drug is repeatedly boiled with water, the decoction concentrated to a few c cm. and mixed with alcohol in order to precipitate the mucilage. From the filtrate the alcohol is to be distilled off, when the residual liquid, on addition of ferric chloride, yields undoubted traces of iodine to bisulphide of carbon, with which the mixture is to be vigorously shaken. Carrageen, which would also be available in considerable quantities for manufacturing iodine, has never been resorted to for that purpose, and that for good reasons. Carrageen is not able to take up iodine from the water of the ocean. This may likewise be demonstrated by the experiment just mentioned; if much more than 5 grams of carrageen are treated in the same way as laminaria, no iodine at all will be found.[1]

[1] See also Stanford's exhaustive papers on the subject, *Pharm. Journal*, xiii (1883), 1019, 1037; xiv (1883 and 1884), 353, 1051; also Wheeler, *Ibid.*, xii (1882), 642. See also Amer. Jour. Phar. (1882), p. 124; (1883), pp. 612, 618; (1884), p. 582.

In a paper of mine[2] I stated that the plants of the natural order Zingiberaceæ are remarkable for the manganese which is to be met with in every part of at least most of those plants. The smallest fragment of cardamoms or of their capsule yields an ash of intensely green color, due to manganates. Other seeds or fruits which I examined in the same way proved free of manganese.

Yet there is another plant particularly remarkable in that respect, viz., the curious *Trapa natans*, L., an annual herb growing in a limited number of localities in several parts of continental Europe. It lives in a very interesting way on the bottom of swamps, from which at the flowering time the leaves rise to the surface of the water. Gorup-Besanez[3] has shown that *Trapa natans*, especially its fruit, is comparatively rich in manganese although it grows in water containing only an extremely small amount of that metal. Like *Laminaria* in the case of iodine, *Trapa natans* is possessed of the singular power of assimilating manganese which it wants from the water. It would be interesting to submit the plant under notice to experiments in order to ascertain whether it can perfectly succeed without manganese, and to investigate whether other plants living in the same water as *Trapa* likewise absorb manganese.

The seeds, *i. e.*, the cotyledons, of the "water nut," *i. e.*, *Trapa natans*, are eaten in Upper Alsatia and the neighboring districts of France as well as in Northern Italy; they were in prehistoric times, in all probability, an item of the food of the inhabitants of the palafittes (Pfahlbauten) of Switzerland. The most characteristic fruit of *Trapa* is abundantly met with in the remains of those prehistoric settlements, thus showing, in the opinion of some botanists,[4] that *Trapa natans* is to be comprised among the species which are on the way to die out. A recent monograph[5] on *Trapa natans*, however, is by no means in favor of such a theory, considering that in olden times swamps were much more abundant in Europe. Consequently the conditions for the growth of *Trapa* were then much more favorable than they are in our days.

There are, strangely enough, two species of the same genus in the East, playing a most important part in the food of the Indian and

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[2] *Pharm. Journal*, iii (1872), 208.

[3] Liebig's *Annalen der Chemie und Pharmacie*, cxviii (1861) p. 223.

[4] Christ, *Das Pflanzenleben der Schweiz*, Zürich, 1879, p. 55, 180, 424, 432.

[5] Täggi, *Die Wassernuss, Trapa natans*, Zürich, 1883, pp. 34, 40.

Chinese population. *Trapa bispinosa*, Roxburgh, indigenous in Bengal and the Peninsula, in the Punjaub as well as in Cashmere, yields enormous quantities of a most valuable contribution to the provisions of the people throughout India,[6] where the plant is also largely cultivated.

And as to China and Japan, *Trapa bicornis*, L. fil., is even much more important to a very large number of the lower people than *Tr. bispinosa* is in India. *Trapa bicornis* abounds in canals and shallow lakes, in localities which are the permanent residence of, probably, millions of Chinese. An excellent figure of the hard fruit of the Chinese species will be found in the 'Science Papers' of my lamented friend, Daniel Hanbury, p. 241.

Now I thought it well worth investigating the presence or absence of manganese in the Asiatic *Trapa*. A few fruits of *Trapa bicornis*, not from China proper, but from the mouth of the river Amur, were examined at my request, in my laboratory, by Mr. Lojander. He immediately succeeded in demonstrating the presence of manganese in the ash of the fruits with which he had been supplied. *Trapa natans* and *Tr. bicornis* being thus proved to be eminently "manganophile" (or manganophage) species, there can be little doubt as to the intermediate *Tr. bispinosa*, which I am sorry not to have at my command; it will very likely also be found to yield manganate if it is treated in the same way as pointed out in my first paper.[7]

Manganese, it is true, is very widely distributed throughout the vegetable kingdom, yet, certainly, by no means uniformly. The plants alluded to in this paper are prominently remarkable for their affinity to that metal.—*Pharm. Jour. and Trans.*, January 23d, 1886, p. 621.

Strassburg, Germany.

THE DETECTION OF METHYLATED ETHER.

By Henry Williams Jones, F.C.S.

Ether prepared from methylated spirit commences to boil at a much lower temperature than ether obtained from rectified spirit; and by such difference the two varieties may be discriminated.

By fractional distillation, the first distillate being several times fractionated, as little as 10 per cent. of methylated ether may be found when mixed with pure ether.

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[6] See also Drury, 'Useful Plants of India,' 2nd edition, 1873, p. 430.

[7] *Pharm. Jour*, iii (1872), 208.

In pharmaceutical preparations in which methylated ether is present, it can also be detected, though the presence of alcohol interferes with the process, and more care is requisite than in merely deciding whether a sample of ether is methylated or not.

A convenient apparatus consists of a Glyusky's distillation tube (with a thermometer) attached to a flask heated by a water-bath, and connected with a Liebig's condenser, the source of heat being a burner of small size, so that the water in the bath may be slowly heated.

The following table exhibits results obtained with an arrangement of this description, by adopting a process of limited fractional distillation; and removing the graduated tube in which the distillate was collected at the moment the thermometer indicated 90° F. The lighter portions of methylated ether carry over much heavier ether, which considerably augments the volume of the distilled portion.

The results are, obviously, in no sense quantitative, being dependent on the particular samples and apparatus employed. They serve, however, to show the modifying influence of pure ether and of rectified spirit.

100 c.c. of each taken.	C.c. obtained.	
Rectified ether specific gravity ·720.....	0	
" " " " ·730.....	0	
Methylated ether specific gravity ·717..	60·	Boiled freely at 74° F.
" " " " ·720..	54·	
" " " " ·730..	23·	
Rectified (·735) and methylated (·730) equal parts.....	7·	After cooling and again heating, a further 5 c.c. obtained.
Sp. Ætheris B.P. (Rectified spirit and methylated ether (·730)).....	4·5	
Tr. Lobeliæ Æther. (Rectified spirit and methylated ether (·730)).....	4·5	
Collodium B.P. (Rectified spirit and methylated ether (·730)).....	6·0	

Whilst it is easy to detect ordinary methylated ether, it is clearly impossible to determine in the case of a liquid of correct boiling point, whether such a sample has been prepared, as the British Pharmacopœia directs, from rectified spirit, or separated by careful fractional rectification from ether originally made from methylated spirit.—*Pharm. Jour. and Trans.*, Feb. 6, 1886, p. 663.

ON THE SPECIFIC GRAVITY OF SULPHUROUS ACID GAS IN SOLUTION.

By B. Gilles and A. Shearer.

The authors have made numerous determinations to ascertain the specific gravities of aqueous solutions of sulphurous acid gas (SO_2), and the percentages of that substance contained therein. Their results are as follows:

Spec. Grav.	Tem.	SO_2 in 100 pts.	Spec. Grav.	Tem.	SO_2 in 100 pts.
1·0051	15·5° C.	0·99	1·0399	15·5° C.	8·08
1·0102	"	2·05	1·0438	"	8·68
1·0148	"	2·87	1·0492	"	9·80
1·0204	"	4·04	1·0541	"	10·75
1·0252	"	4·99	1·0597	12·5° C.	11·65
1·0297	"	5·89	1·0668	11·0° C.	13·09
1·0353	"	7·01			

The authors in conclusion state that when the determinations at 15·5° C. and 760 mm. pressure were made, the specific gravity was increased in the proportion of 0·005 for every augmentation of 1 part in 100 of the quantity of sulphurous acid gas.

This last statement is a most important confirmation of the results of previous experiments; and if Scott's determinations at 15° C. and Hager's at 17·5° C. (See *National Dispensatory*, 3d edit, p. 102) be placed under this rule, a curious uniformity of comparative results will be observed. *Annali di Chim. Med. Far.*, 1885, p. 244; *Jour. Soc. Chim.*, iv., p. 303. J. W. E.

DOUBLE NITRATES OF SILVER AND THE ALKALIS.

By A. Ditte.

When a solution containing silver and potassium nitrates is slowly concentrated, potassium nitrate at first crystallizes alone, but as soon as the liquid contains at least 3 mols. of silver nitrate for each mol. of potassium nitrate bulky, transparent, right rhombic prisms are formed. These prisms are highly modified and have the composition $AgNO_3,KNO_3$. This double salt is always formed when a solution of the two nitrates contains so much of the silver salt that both nitrates can crystallize simultaneously. If the double salt is treated with water, the silver nitrate is gradually removed.

Rubidium nitrate yields a strictly analogous double salt, and in all probability cæsium nitrate will behave in the same way.

If a solution of silver and ammonium nitrates is gradually concen-

trated, the silver salt, being less soluble, crys'allizes alone, but after a time the double nitrate $AgNO_3,NH_4NO_3$, separates in crystals similar to those of the potassium compound. This double salt is easily obtained whenever the mixed solutions contain an excess of the ammonium salt.

Rose stated that a solution of silver and sodium nitrates containing an excess of the former, first yields crystals of silver nitrate only, and afterwards crystals of the double nitrates $AgNO_3,2NaNO_3$; and $AgNO_3,4NaNO_3$. The author finds that when the silver nitrate is in excess, this salt crystallizes alone in its ordinary form, but as soon as sodium nitrate begins to separate also, the two salts crystallize together, and the crystals take the ordinary form of sodium nitrate. Whatever the original composition of the solution, the composition of the crystals and the mother-liquor varies continuously, however, and no definite compounds are formed. From this result it follows that silver nitrate is dimorphous, and that one of its forms is isomorphous with sodium nitrate, but the author has not been able to obtain pure silver nitrate in rhombohedrons.

Lithium nitrate crystallizes below 10° in prismatic needles containing $5\,H_2O$, and if a mixture of silver and lithium nitrates is allowed to crystallize at this temperature, the two salts crystallize separately. Above 15°, however, lithium nitrate forms anhydrous crystals similar to those of sodium nitrate, and if a solution of silver and lithium nitrates is concentrated at this temperature, the two salts crystallize together in rhombohedrons, but the composition of the crystals and the mother-liquor varies continuously as in the case of sodium nitrate.—*Jour. Chem. Soc.*, 1886, p. 122; *Compt. rend.*, ci, p. 878–881.

The effects of alcohol, of beer, of black coffee, of tobacco, of salt, and of alum, on digestion.—Dr. Carl Bikfalvi (*Pester med. chir. Presse*), thus sums up the conclusions he has arrived at by experimental research: (1) Alcohol slows the natural digestion even in small amounts. It hinders the conversion of dextrin into grape sugar less than it does the digestion of albumins. (2) Beer, even in small amount, does not assist digestion. (3) Wine in small amount does not injure digestion, and may even help it; large quantities delay digestion. (5) Black coffee in small quantities stimulates digestion, in large quantities hinders it. (6) Tobacco extract has no appreciable effect on artificial digestion. (7) Small quantities of common salt assist digestion, larger amounts considerably retard it. (8) Alum hinders digestion, and, even in very small amounts, arrests the conversion of dextrin.—*Med. Chronicle*, December, 1885, p. 230.

ANNATTO.*

By William Lawson.

The subject which I have the honor to bring shortly before your notice this evening is one that formed the basis of some instructive remarks by Dr. Redwood in November, 1855, and also of a paper by Dr. Hassall, read before the Society in London in January, 1856, which latter gave rise to an animated discussion. The work detailed below was well in hand when Mr. MacEwan drew my attention to these and kindly supplied me with the volume containing reports of them. Unfortunately they deal principally with the adulterations, while I was more particularly desirous to learn the composition in a general way, and especially the percentage of coloring resin, the important constituent in commercial annatto. Within the last few years it was one of the articles in considerable demand in this part of the country; now it is seldom inquired for. This certainly is not because butter coloring has ceased to be employed, and hence the reason for regretting that the percentage of resin was not dealt with in the articles referred to, so that a comparison could have been made between the commercial annatto of that period and that which exists now. In case some may not be in possession of literature bearing on it—which, by the way, is very meagre—it may not be out of place to quote some short details as to its source, the processes for obtaining it, the composition of the raw material, and then the method followed in the present inquiry will be given, together with the results of the examination of ten samples; and though the subject doubtless has more interest for the country than for the town druggist, still, I trust it will have points of interest for both.

Annatto is the coloring matter derived from the seeds of an evergreen plant, *Bixa Orellana*, which grows in the East and West Indian Islands and South America, in the latter of which it is principally prepared. Two kinds are imported, Spanish annatto, made in Brazil, and flag or French, made mostly in Cayenne. These differ considerably in character and properties, the latter having a disagreeable putrescent odor, while the Spanish is rather agreeable when fresh and good. It is, however, inferior to the flag as a coloring or dyeing agent. The seeds from which the substance is obtained are red on the outside, and two methods are followed in order to obtain it. One is to rub or wash off the coloring matter with water, allow it to subside, and to expose it to spontaneous evaporation till it acquires a pasty consistence. The other is to bruise the seeds, mix them with water and allow fermentation to set in, during which the coloring matter collects at the bottom, from which it is subsequently removed and brought to the proper consistence by spontaneous evaporation. These particulars, culled from Dr. Redwood's remarks, may suffice to show its source and the methods for obtaining it.

Dr. John gives the following as the composition of the pulp surrounding the seeds: Coloring resinous matter, 28; vegetable gluten, 26·5; ligneous fibre, 20; coloring, 20; extractive matter, 4; and a trace of spicy and acid matter.

It must be understood, however, that commercial annatto, having undergone processes necessary to fit it for its various uses, as well as to preserve it, differs

*Read at an Evening Meeting of the North British Branch of the Pharmaceutical Society, January 21st.

considerably from this, and though it may not be true, as some hint, that manufacturing in this industry is simply a term synonymous with adulterating, yet results will afterwards be given tending to show that there are articles in the market which have little real claim to the title. I tried, but failed, to procure a sample of raw material on which to work with a view to learn something of its character and properties in this state, and thus be able to contrast it with the manufactured or commercial article. The best thing to do in the circumstances, I thought, was to operate on the highest priced sample at disposal, and this was done in all the different ways that suggested themselves. The extraction of the resin by means of alcohol—the usual way, I believe—was a more troublesome operation than it appeared to be, as the following experiment will show: One hundred grains of No. 8 were taken, dried thoroughly, reduced to fine powder, and introduced into a flask containing 4 ounces of alcohol in the form of methylated spirit, boiled for an hour—the flask during the operation being attached to an inverted condenser—filtered off, and the residue treated with a smaller amount of the spirit and boiled for ten minutes. This was repeated with diminishing quantities until in all 14 ounces had been used before the alcoholic solution ceased to turn blue on the addition to it of strong sulphuric acid, or failed to give a brownish precipitate with stannous chloride. As the sample contained a considerable quantity of potassium carbonate, in which the resin is soluble, it was thought that by neutralizing this it might render the resin more easy of extraction. This was found to be so, but it was accompanied by such a mass of extractive as made it in the long run more troublesome, and hence it was abandoned. Thinking the spirit employed might be too weak, an experiment with commercial absolute alcohol was carried out as follows: One hundred grains of a red sample, No. 4, were thoroughly dried, powdered finely, and boiled in 2 ounces of the alcohol, filtered, and the residue treated with half an ounce more. This required to be repeated with fresh half ounces of the alcohol until in all 7½ were used, the time occupied from first to last being almost three hours. This was considered unsatisfactory, besides being very expensive, and so it, also, was set aside, and a series of experiments with methylated spirit alone was set in hand. The results showed that the easiest and most satisfactory way was to take 100 grains (this amount being preferred as it reduces error to the minimum), dry thoroughly, powder finely, and macerate with frequent agitation for twenty-four hours in a few ounces of spirit, then to boil in this spirit for a short time, filter, and repeat the boiling with a fresh ounce or so; this, as a rule, sufficing to completely exhaust it of its resin. Wynter Blyth says that the red resin, or bixin, is soluble in 25 parts of hot alcohol. It appears from these experiments that much more is required to dissolve it out of commercial annatto.

The full process followed consisted in determining the moisture by drying 100 grains at 212° F. till constant, and taking this dried portion for estimation of the resin in the way just stated. The alcoholic extract was evaporated to dryness over a water-bath, the residue dissolved in solution of sodium carbonate and the resin precipitated by dilute sulphuric acid (these reagents being chosen as the best after numerous trials with others), added in the slightest possible excess. The resin was collected on a tared double filter paper, washed with distilled water until the washings were entirely colorless, dried and weighed.

The ash was found in the usual way, and the extractive by the difference. In

the ash the amount soluble was determined, and qualitatively examined, as was the insoluble portion in most of them.

The results are as follows:

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Moisture .	21·75	21·60	20·39	69·73	18·00	18·28	15·71	38 18	19.33	22·50
Resin . .	3·00	2.90	1·00	8·80	3·00	1·80	5·40	12·00	5·90	9 20
Extractive.	57·29	59·33	65·00	19·47	58.40	65·67	26·89	20·82	23·77	28·50
Ash . . .	17.96	16·17	13·61	2·00	20·60	14·25	52·00	29·00	51 00	39·80
	100·00	100·00	100 00	100·00	100·00	100 00	100·00	100·00	100·00	100·00
Ash . . .				Almost						
Soluble . .	13·2	12 57	7·5	wholly	10·	11·75	18·5	20·0	15·	13·8
Insoluble .	4·76	3·6	6·11	NaCl.	10·6	2·5	33·5	9·0	36·	26·

The first six are the ordinary red rolls, with the exception of No. 4. which is a red mass, the only one of this class direct from the manufacturers. The remainder are brown cakes, all except No. 7, being from the manufacturers direct. The ash of the first two was largely common salt; that of No. 3 contained, besides this, iron in some quantity. No. 4 is unique in many respects. It was of a bright red color, and possessed a not disagreeable odor. It contained the largest percentage of moisture and the lowest of ash; had, comparatively, a large amount of coloring matter; was one of the cheapest, and in the course of some dairy trials, carried out by an intelligent farmer, was pronounced to be the best suited for coloring butter. So far as my experience goes, it was a sample of the best commercial excellence, though I fear the mass of water present and the absence of preserving substances will assist in its speedy decay. Were such an article easily procured in the usual way of business there would not be much to complain of, but it must not be forgotten that it was got direct from the manufacturers—a somewhat suggestive fact when the composition of some other samples is taken into account. No. 5 emitted a disagreeable odor during ignition. The soluble portion of the ash was mostly common salt, and the insoluble contained three of sand—the highest amount found, although most of the reds contained some. No. 6 was a vile looking thing, and when associated in one's mind with butter, gave rise to disagreeable reflections. It was wrapped in a paper saturated with a strongly smelling linseed oil. When it was boiled in water and broken up, hairs, among other things, were observed floating about. It contained some iron. The first cake, No. 7, gave off during ignition an agreeable odor resembling some of the finer tobaccos, and this is characteristic more or less of all the cakes. The ash weighed 52 per cent., the soluble part of which, 18·5, was mostly potassium carbonate with some chlorides and sulphates; the insoluble, mostly chalk with iron and alumina. No. 8—highest priced of all—had in the mass an odor which I can compare to nothing else than a well rotted farmyard manure. Twenty parts of the ash were soluble and largely potassium carbonate, the insoluble being iron for the most part. The mineral portions of Nos. 9 and 10 closely resembled No. 7.

On looking over the results it is found that the red rolls contained starchy matters in abundance (in No. 4 the starch was to a large extent replaced by water), and an ash, mostly sodium chloride, introduced, no doubt, to assist in its preservation as well as to increase the color of the resin; a well-known action of salt on vegetable reds. The cakes, which are mostly used for cheese coloring, I believe, all appeared to contain turmeric, for they gave a more or less

distinct reaction with the boric acid test, and all except No. 8 contained large quantities of chalk. The results in reference to extractive, etc., reveal nothing that has not been known before. Wynter Blyth, who gives the only analysis of annatto I have been able to find, states that the composition of a fair commercial sample (which I take to mean the raw article) examined by him, was as follows: water, 24·2; resin, 28·8; ash, 22·5, and extractive, 24·5; and that of an adulterated (which I take to mean a manufactured) article: water, 13·4; resin, 11·0; ash (iron, silica, chalk, alumina and common salt), 48·3, and extractive, 27·3. If this be correct, it appears that the articles at present in the market, or at least those which have come in my way, have been wretched imitations of the genuine thing, and should, instead of being called adulterated annatto, be called something else adulterated, but not seriously, with annatto. I have it on the authority of the farmer previously referred to, that ½ of an ounce of No. 4 is amply sufficient to impart the desired cowslip tint to no less than 60 lbs. of butter. When so little is actually required, it does not seem of very serious importance whether the adulterant or preservative be flour, chalk, or water, but it is exasperating in a very high degree to have such compounds as Nos. 3 and 6 palmed off as decent things, when even Nos. 1, 2 and 5 have been rejected by dairymen as useless for the purpose. In conclusion, I may be permitted to express the hope that others may be induced to examine the annatto taken into stock more closely than I was taught to do, and had been in the habit of doing, namely, to see if it had a good consistence and an odor resembling black sugar, for if so, the quality was above suspicion.—*Phar. Jour. and Trans.*, January 30, 1886, p. 645.

VARIETIES.

NITROGLYCERIN has been successfully employed by Dr O T. Shultz, of Mount Vernon, Ind., in a severe case of hiccough. One drop of a one per cent. solution of nitroglycerin was given every hour at first, the time being gradually extended. On the second day after commencing this treatment permanent relief was obtained.—*Amer. Practitioner*, 1885.

CANNABIS INDICA is recommended by Dr. H. L. Jones as a hypnotic in cases where sleeplessness is accompanied by delirium. The extract is given in pills in doses of 2 or 3 grains every four or six hours. Frequently one dose was found to be sufficient. Hallucinations were complained of only in one case.—*Amer. Practitioner*, 1885.

OIL OF SASSAFRAS, in teaspoonful doses, has been found serviceable by Dr. T. J. Miller, of Roanoke, Va., in neuralgia, the patients also becoming cheerful and exhilarated.—*Va. Med. Monthly*, Jan., 1886.

DR. J. BARTLETT, of Chicago (*Chic. Med. Jour. and Exam.*, Dec., 1885), directs attention to the oxytocic effects of sassafras tea, and to the narcotic action of excessive doses of oil of sassafras.

COCAINE IN WHOOPING COUGH.—Dr. Moncorvo recommends mopping of the upper part of the larynx first with a one per cent. solution of resorcin, and,

subsequently, with a 10 per cent. solution of cocaine hydrochlorate, the latter application to be repeated more frequently.—*Lancet*, 1885.

Dr. Barbillon (*Rev. des Mal. de l'Enf.*) has used in a similar manner, but without resorcin, a five per cent. solution of cocaine hydrochlorate from two to four times a day. The duration of the disease does not appear to be shortened, but the paroxysms of coughing are considerably diminished and vomiting is arrested.

Atropine in doses of $\frac{1}{120}$ grain has been used by Dr. R. Gray in acute coryza with the effect of relieving the headache, reducing the temperature and diminishing the discharge.—*Med. News*, 1885.

Tupelo in Dilatation of the Uterine Cervix.—Ménière regards the tupelo root as preferable to sponge or laminaria for the following reasons:

1. Tupelo acquires its maximum degree of expansion in less than an hour and a half, while sponge and laminaria require from six to seven hours.

2. Its surface remains soft, pliable, and spongy, and in extracting it there is no danger of injury to the mucous membrane.

3. It returns with facility to its former size and shape, and may be used several times if subjected to disinfection in mercuric chloride after each operation.—*Gaz. de Gynécologie*, Jan. 1, 1886. *Med. News.* See also *Amer. Jour. Phar.*, 1883, p. 631.

MINUTES OF THE PHARMACEUTICAL MEETING.

The fifth meeting of the present series was called to order by the actuary, and Mr. Clement B. Lowe was elected chairman.

The minutes of the last meeting were read, and, there being no corrections required, they stand approved.

The actuary presented for Messrs. W. T. Baker & Co., of this city, on behalf of Messrs. Parke, Davis & Co., of Detroit, a cabinet of Materia Medica Specimens, arranged for the use of pharmacy and medical students. The thanks of the meeting were voted for this donation.

The actuary presented the Year-Book of Pharmacy for 1885, which work is issued by the British Pharmaceutical Conference, and represents to English pharmacists what the Proceedings of the American Pharmaceutical Association do to Americans; and also the Calendar of the Pharmaceutical Society of Great Britain for 1886. This work contains a calendar showing the dates of the examinations, meetings of council, legal holidays, times for opening and closing museum and library, and other matters of general interest to the society and trade; a sketch of the origin of the society, the charter, the various acts bearing upon pharmacy, the by-laws, list of officers, members, associates both those in business and not in business, registered apprentices or students of the society, regulations of the board of examiners, centers at which examinations are held, and a large amount of other information of interest to the trade and those intending to enter it.

Mr. Bullock exhibited a specimen of *Terpin*, a stearopten possessing medical properties similar to those of oil of turpentine. This is a hydrate of oil of turpentine, having the composition $C_{10}H_{20}O_2+H_2O$, it crystallizes in transparent

prismatic needles, fuses at about 100° C., losing its water of crystallization, and sublimes undecomposed at a higher temperature; it is sparingly soluble in cold water, more so in hot water, and is freely soluble in alcohol, ether and acetic acid. Its alcoholic solution will bear considerable dilution with water without precipitation of the terpin. Wiggers states that it may be prepared by adding two parts of nitric acid 1·25 to 1·30 to eight parts of oil of turpentine and one part of alcohol, sp. gr. 863, shaking the mixture well for several days, then setting aside at a temperature of 68° to 78°, for the terpin to crystallize. Its dose is about 3 to 6 grains (see AMER. JOUR. PHARM., 1885, p. 293).

Hydro-naphthol was also shown by Mr. Bullock. Under this name an article has lately been introduced as an antiseptic for surgical dressings. Naphthol, $C_{10}H_7OH$, is a derivative of napthalene, $C_{10}H_8$, by the substitution of one molecule of hydroxyl for one of the hydrogen atoms in the naphthalene. When naphthalene is heated with sulphuric acid, two isomeric sulphonaphthalic acids are formed, called alpha and beta sulphonaphthalic acids; if the heat is carried to 160° C., the product is almost entirely beta sulphonaphthalic acid; by heating sulphonaphthalate of potassium with potassium hydroxide, two forms of naphthol are obtained, called alpha and beta naphthol. Hydronaphthol, as it appears in the market, is a gray powder of a micaceous appearance, and a faint odor resembling naphthalene, it fuses between 113° and 118° C., at 126° C. gives off vapor and commences to sublime at 130° C., and sublimes completely between 140° and 145° C., giving a product of small, colorless rhombic plates; it commences to boil at 260° and the boiling point is almost constant at 280° C. A dark carbonaceous residue is left after sublimation. From these properties the so-called hydronaphthol appears to correspond with beta naphthol in an impure condition. It dissolves in 100 parts of hot water, which after cooling retains in solution about 1 part in a thousand. It is freely soluble in alcohol, ether, benzol and the alkalies; alkaline solutions are said to impair the antiseptic qualities of the article.

Prof. Trimble exhibited specimens of the root of *Yerba del Indio*, a Mexican remedy for colic, and used in the arts for tanning. This sample was sent from Texas by Mr. H. J. Schuchard, a graduate of this college. When first received it was in the green state and was very astringent, but after drying it had lost much of its astringency and was attacked by insects. Mr. S. S. Jones, of the present class, experimented with it, and it was from his work that the facts were ascertained described in the paper read by Prof. Trimble (see page 113). Prof. Maisch stated that some ten years since Mr. Voelcker examined a root called *Raiz del Indico*, and found it to contain chrysophanic acid and other principles, present in certain polygonaceous roots; this root was very similar to the specimens exhibited, but was smaller.

Prof. Maisch exhibited to the meeting specimens, sent by Prof. Soubeiran, of very slender *ergot*, with the inflorescence of a large grass, called *diss* by the Arabs of Algeria, upon which the ergot had grown.

Prof. Maisch also exhibited specimens of *assahy* and *bacaba*, palmseeds, sent from Brazil to Mr. Louis Dohme of Baltimore, and made the following statements: *Assahy or assay* is the Brazilian name for Euterpe edulis, *Martius*, the young shoots of which and of some allied species are used as pot-herbs; the fruit bruised and macerated with water, yields a wine-colored filtrate, which, mixed with sugar, furnishes an agreeable refrigerant beverage. A butyraceous

oil, known as *assahy butter*, is stated to be prepared from Euterpe oleracea, *Martius*, which plant is known as *jussára* or *jissara*, a name also given to the former species, according to some authors.

Bacaba is Oenocarpus Bacaba, *Martius*, the mucilaginous fruit of which is largely used for food by the natives of Brazil; the decoction deposits a sediment, which, on being dried in the sun, becomes very hard, and in this condition may be preserved for a long time, but on softening it in water furnishes a nutritious food. The seeds of this palm and of Oenocarpus distichus, perhaps also of Ol. Patawa, *Martius*, yields a fixed oil known as *comou butter*, which is used for the manufacture of soap and of candles, and for culinary purposes.

Among what may be termed the curiosities of the trade, the actuary exhibited a mass of stone, weighing 55 lbs., which was taken from a case of *Corigliano licorice*, in which it had been packed for the purpose of increasing the weight; such a wholesale fraud it was thought should be traced back to its authors, as it was most deliberately done.

Mr. A. M. Todd, of Nottawa, Mich., was introduced by Prof. Trimble, and, in response to an invitation, proceeded to give to the meeting some of the results of his experience in the manufacture of *oil of peppermint* and *menthol;* he being largely engaged in that industry.

The process for the distillation of oil of peppermint in use in this country, and which has entirely superseded the old process, was introduced about twenty-five years ago, and consists of using wooden vessels, steam being driven through the herb placed on false bottoms; the vessels are of such capacity that fifty tons of herb per diem of twenty-four hours can be worked off. When the fresh herb is distilled, it requires generally an hour to obtain all the oil; but if it has been partially dried, thirty minutes will suffice to accomplish the purpose. Formerly it was the common practice to allow the water of the distillate to run to waste, and this occasioned an enormous loss of oil; now, after the oil has been collected from the distillate, this is again used to steam through the herb, and, as it is already charged with all the oil it will hold in solution, it effects a great saving in the process. The condensation is effected by passing the distillate which is drawn off from the body of the still through a five-inch pipe into a number of copper pipes, tinned inside, and these are connected with block tin worms, two inches in diameter and one hundred feet long, connected with the receivers. The first portions of the distillate are more limpid than those which are drawn off afterward, and the last portion is more resinous and bitter.

To obtain the *menthol*, the vessel, which he calls the container, has an inner vessel for the purpose of refrigerating the oil, and is surrounded also with a wooden refrigerating vessel. In the container is a valve above the bottom from which to draw off the uncongealed oil. The oil will, in rare instances, furnish crystals without artificial cold, but generally a mixture of ice and salt is used for refrigeration, by which a temperature of —8° F. is obtained. However, some specimens of oil from certain localities congeal at 24° F., this being about the highest temperature at which the natural oil from true peppermint has been observed to crystallize. The mass of crystals at first more resemble paraffin than regular crystals, but if care is taken to remove the fluid portion while a low temperature is maintained, the crystalline formation is more distinct, and will remain solid at about 110° F. The crystals formed towards the close of the process are harder and firmer. The commercial crystals are finer and still have

some of the oil adherent, but the pure and perfect crystals are more free from oily matter. When the oil is reduced to zero, the yield of menthol crystals is about twenty per cent. of the oil subjected to the process, but varies, and, strange as it may seem, the specific gravity of the oil has changed but one one-thousandth from its original density. So far as observation has gone no difference in therapeutic value or power has been noticed between the crystals and the liquid portion of the oil, when a *pure* oil is compared with it. As a rule, the oils produced in Michigan are of good quality, the farmer being careful of the character of the crop; some lots of oil have been observed containing as much as forty per cent. of alcohol. The first portion of the distillate obtained in rectification is inodorous, and at —8° F. yields no menthol, while the last portion is extremely odorous and is also destitute of menthol, but the temperature at which the separate fractions boil has not been tabled. In fractioning 400 lbs. of pure, natural oil of ·915° sp. gr. in twenty pound fractions, extremely interesting results were obtained as to the variations in specific gravity, but not having his memoranda at hand, Mr. Todd could not state the changes with sufficient exactness. The first fraction was obtained in about 30 minutes, the last required six hours.

Professor Maisch inquired whether the first or inodorous portion was as useful as the middle or aromatic portion, which one would seem to regard as more desirable.

Mr. Todd replied that he had never investigated the therapeutic action of the first or light portion separately, yet he did not consider it as valuable by itself for all the purposes for which the united fractions were useful, though it may contain some distinct and valuable properties peculiar to itself. He has recently undertaken the study of these fractions in their physical aspects, and it would also be interesting to determine their therapeutic relations. The true characteristics of pure essential oils seem not to have been determined and laid down in the books with sufficient exactness, and their study affords a field for the most fruitful research.

Mr. Bullock moved, and it was seconded, that the thanks of the meeting were due and should be tendered to Mr. Todd for his very interesting remarks upon oil of peppermint and menthol with which he had favored the meeting. This was unanimously adopted.

There being no further business, on motion adjourned.

T. S. Wiegand, *Registrar.*